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An Evaluation of a Computer Code Based on Linear Acoustic Theory for Predicting Helicopter Main Rotor Noise

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16. Abstract

In this report, the correlation of acoustic characteristics predicted using a recently developed computer code with measured acoustic data for two helicopter rotors is reported. The analysis, developed by F. Farassat and P. Nystrom of NASA Langley Research Center is based on a solution of the Ffowcs-Williams-Hawkings (FW-H) equation and includes terms accounting for both the thickness and loading components of the rotational noise. Computations are carried out in the time domain and assume free-field conditions.

Results of the correlation show that the Farrassat/Nystrom analysis when using predicted airload data as input yields fair but encouraging correlation for the first 6 harmonics of blade passage. It also suggests that although the analysis represents a valuable first step towards developing a truly comprehensive helicopter rotor noise prediction capability, further work remains to be done identifying and incorporating additional noise mechanisms into the code.

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AN EVALUATION OF A COMPUTER CODE BASED ON LINEAR ACOUSTIC THEORY FOR PREDICTING HELICOPTER MAIN ROTOR NOISE

SUMMARY

In this report, the correlation of acoustic characteristics predicted using a recently developed computer code with measured acoustic data for two helicopter rotors is reported. The analysis, developed by F. Farassat and P. Nystrom of NASA Langley Research Center is based on a solution of the Ffowcs-Williams-Hawkings (FW-H) equation and includes terms accounting for both the thickness and loading components of the rotational noise. Computations are carried out in the time domain and assume free-field conditions. The analysis is completely general and not unduly restrictive with regard to the position of the observer and the representation of the aerodynamic and physical characteristics of the noise source. It does, however, require a detailed rotor geometry and aerodynamic loading input. A data base consisting of both measured and predicted rotor airload data plus rotor geometric data for the aircraft studied has been developed for use with the code and is reported herein.

Results of the correlation show that the Farassat/Nystrom analysis when using predicted airload data as input yields fair but encouraging correlation for the first 6 harmonics of blade passage. It also points out the difficulities involved in correctly accounting for ground reflection effects and suggests that although the analysis represents a valuable first step towards developing a truly comprehensive helicopter rotor noise prediction capability, further work remains to be done such as identifying and incorporating additional noise mechanisms into the code to increase its capabilities, and improving the accuracy of the predicted input airload data.

INTRODUCTION

In the past, rotor noise has not been a primary consideration in the design of helicopters. However, with the increasing importance of noise control to both civil and military helicopter operation, noise prediction and control efforts will assume a much greater role in the design of new helicopters. Most currently used noise prediction techniques are semi-empirical and thus cannot be reliably employed for configurations which are significantly different from those upon which the empirical data base is founded.

A recent method developed for the prediction of helicopter noise and based wholly on fundamental acoustic principles is the Farassat/Nystrom analysis. This analysis is based on a solution of the Ffowcs-Williams-Hawkings (FW-H) equation by F. Farassat (Reference 1). The quadrupole source term in the FW-H equation is neglected in obtaining this solution. The computer code resulting from this analysis is completely general and is not unduly restrictive with regard to observer position, movement of the noise source relative to the observer, and representation of the aerodynamic and physical characteristics of the noise source. The code does, however, require detailed input specification of the rotor characteristics, operating conditions, and rotor blade surface pressure distribution.

The predictive methodology used to provide the required rotor blade surface pressure distributions for input to the acoustic analysis is described in this report. This methodology consists of essentially two parts, the blade spanwise airloading and the chordwise pressure loading. These two parts have been combined into an analysis capable of providing the required pressure distributions for the acoustic analysis.

The objectives of this study, as reported herein, are to:

(1) establish a documented data base of rotor geometric and aerodynamic characteristics for input to the Farassat/Nystrom program.

(2) determine the sensitivity of the analytically predicted noise to the input rotor airload and rotor geometry characteristics and explore the operational use and limits of the program.

(3) generate acoustic pressure signature and harmonic spectra for two modern helicopters and compare them with measured acoustic data.

Under this study a data base of aerodynamic characteristics and rotor geometries are provided for two aircraft each operating at two different flight speeds. The Sikorsky CH-53A and S-76 aircraft were chosen for this activity. A measured data base was obtained from flight test data for the CH-53A aircraft and predicted data bases for both aircraft were obtained using the predictive methodology noted above. Using these data bases, the

acoustic analysis was used to obtain the corresponding pressure signatures and harmonic spectra. Included in this report are descriptions of the methodology used and the results obtained.

LIST OF SYMBOLS

a_o	rotor coning angle, deg.
a_{1s}	longitudinal blade flapping angle, deg.
A_{1s}	rotor lateral cyclic pitch angle, deg.
b_{1s}	lateral blade flapping angle, deg.
B_{1s}	longitudinal cyclic pitch angle, deg.
c	speed of sound, m/sec.
c_p	pressure coefficient, $(P_1 - P_\infty)/\frac{1}{2}\rho V_\infty^2$.
c_{pi}	incompressible pressure coefficient.
D	distance, m.
dS	incremental blade area, m^2.
h_s	noise source height above ground plane, m.
h_R	receiver (microphone) height above ground plane, m.
l_r	force per unit area acting on the fluid in the radiation direction, $\Delta p \times n_i \times \hat{r}_i$, pa.
M_r	mach number of the blade in the radiation direction, $V_i \hat{r}_i / C$
M_∞	free stream mach number
$\vec{n}, n_i$	local unit outward normal (to the blade surface)
$p'(\vec{x},t)$	acoustic pressure, pa.
Δp	local differential pressure over blade surface, $P_{LS} - P_{US}$, pa.
r	distance from noise source to observer, m.
r_1, r_2	components of ground reflected wave, m.
$\hat{r}_i$	unit vecotr in the radiation direction.
R	rotor blade radius, m.
η_2/R	spanwise position on rotor blade normalized by rotor radius.

List of Symbols - (cont'd)

t	observer time, sec.
$\vec{x}$	observer position vector
x/c	chordwise coordinate of airfoil section normalized by section chord
y/c	airfoil section coordinate in thickness direction normalized by section chord
V_i	local surface velocity of rotor blade, m/sec
V_n	local normal velocity on rotor blade, m/sec
V_∞	free stream velocity, m/sec
α_s	longitudinal inclinaton of the rotor shaft, deg
α_{TPP}	rotor tip path plane angle, deg
β	rotor flapping angle, deg
β_{180}	rotor flapping angle at ψ = 180 deg
γ_{HOR}	longitudinal inclination of the rotor plane with respect to the the horizon, deg (see Figure 62).
γ_{OS}	angle between horizon and ray connecting noise source with observer, deg (see Figure 62).
γ_{OSC}	angle between rotor disc plane and observer, $\gamma_{OS} + \gamma_{HOR}$, deg (see Figure 62).
θ_{75}	rotor blade collective pitch angle at 75% radius station, deg.
$\Delta\lambda$	rotor wake displacement inflow ratio
μ	rotor advance ratio, $V_{FLIGHT} \cos \alpha_{TPP}/V_{Tip}$
ρ_o	ambient atmospheric density, kg/m^3
ψ	rotor azimuth position or ground wave reflection angle (see Figure 10), deg.
η_2	radial distance along rotor blade, m

Subscripts

ret	retarded time -observer time t minus the time required for sound to travel from the source to the observer.
blades	when used with the integral sign signifies integration over all rotor blades.

DESCRIPTION OF THE FARASSAT/NYSTROM ACOUSTIC ANALYSIS

General Characteristics

The Farassat/Nystrom analysis utilizes numerical analysis techniques applied to a solution of the Ffowcs Williams-Hawkings (FW-H) equation to predict the acoustic pressure time history and noise spectrum of a helicopter rotor or propeller.

A close inspection of the solution (See Figure 1) reveals that the acoustic pressure $p'(\vec{x},t)$ is assumed to be composed of three components, namely:

(a) Thickness Noise
(b) Farfield Noise due to blade loading
(c) Near field noise due to blade loading

Note that the thickness noise is dependent on the distribution of the velocity normal to the surface of the blades (due to the 3-dimensional shape of the rotor blade) while the blade loading components are dependent on the local differential pressures on the blade.

The actual computation is performed by dividing the blades into small panels of area dS, determining the retarded time for each panel, and then evaluating the integrals for all the blades at a fixed observer position and time $(\vec{x},t)$. Repeating this process for values of time $t+\Delta t$ over a fixed interval allows the determination of the acoustic pressure signature over that time period. The resulting signature is then Fourier analyzed to obtain the acoustic pressure spectrum.

The basic acoustic analogy, an example of its utilization in an earlier version of this analysis, and a recent compilation of helicopter and propeller noise prediction formulations are given in References 1, 2, and 3. Reference 2, in particular, reports on the excellent agreement between experimental and theoretical (both acoustic pressure and signature and harmonic spectra) data obtained by applying the earlier version of this analysis to a fixed wing aircraft propeller in forward flight.

Advantages

Within the constraints of the mechanisms modelled and the assumption of linearity, the acoustic formulation used in this analysis is perfectly general. That is, the variables expressing the position and movement of the noise source relative to the observer ($\vec{x}$, $\hat{r}_i$, r, and V_i), the variables dependent on the dimensions of the noise source ($\vec{n}$, V_n), and the variables specifying the loading on the rotor ($p,\vec{n}$) are not restricted in any sense and are functions of time t. It is therefore only necessary to provide in the total analysis, external to the actual formulation, a detailed representation of these variables plus any corrections (e.g. Doppler shift effects, etc.) necessary.

The advantages thereby derived can be summarized as follows:

(1) The position of the observer is not restricted to either the far or near fields since source terms for both are contained in the formulation.

(2) The noise source (rotor or propeller) can be moving or fixed with respect to the observer.

(3) Rotor or propeller chord and thickness can be varied in the spanwise direction.

(4) Blade surface loading can be specified as a function of blade azimuthal position as well as being a function of chordwise and spanwise position.

Program Input Requirements

The version of the Farassat/Nystrom analysis evaluated in this report is programmed on an IBM 370/168 computer. The input data is divided into two types. These are:

(a) Operating data and blade geometric characteristics
(b) Airload differential pressure data

Table 1 lists the type (a) input variables and their format. Note that the operating data is input in a namelist format (original NASA format) while the blade characteristics are input in a Sikorsky devised free field format. Note also that these blade characteristics can be input at up to 20 stations (either chordwise or spanwise - depending on the particular item being input). Table 2 illustrates a typical type (a) input with the various blade characteristics clearly labelled. Type (b) data is input as a function of blade span, chord, and azimuth position. Up to 15 spanwise, 15 chordwise stations and 145 azimuthal stations may be input, the only limitation being that their product may not exceed 16,425. Table 3 details the input format required and Table 4 illustrates a typical type (b) input with the various items clearly labelled.

Program Output

The program output includes (a) a restatement of the more important input parameters, (b) integrated results such as rotor torque, power, thrust and overall sound pressure levels, (c) the overall and component rotor pressure signature as a function of time, and (d) the overall and component pressure spectra. Table 5 illustrates a typical output. Definition of the items DT, Period, BPF, RMNO, and VMNO are provided in Table 6.

Operational Considerations

Rotor/observer position coordinates

Figure 2 illustrates the coordinate system required for specifying the position of the observer relative to the helicopter. The origin (0,0,0) is positioned at the rotor hub.

Rotor Angular Position

The rotor control and position angle sign convention used in this analysis is opposite in sign to that used in more conventional helicopter nomenclature (see Reference 4). For example:

(1) The rotor tip path plane angle (ALPHAR) is conventionally defined as negative when the rotor tip path plane is pitched forward for forward flight. In the Farassat/Nystrom analysis, this is defined as positive.

(2) The conventional formulation of blade control and flapping angles utilizes negative signs before the harmonic components of the respective Fourier series, viz:

$$\beta = a_o - a_{is}\cos\psi - b_{is}\sin\psi$$

$$\theta = A_o - A_{is}\cos\psi - B_{is}\sin\psi$$

In the Farassat/Nystrom analysis positive signs are used. Thus conventionally defined harmonic control and flapping angles must be reversed in sign before use in this analysis.

Table 7 provides a comparison of these input quantities with their equivalents in conventional helicopter notation.

Sensitivity to Variation of Computational Grid Size

The accuracy of the output data is limited by the size of the input airload data matrix. Thus, a computational grid finer than the input airload data matrix size is unnecessary. Figures 3 and 4 illustrate this very well. The airload input data used for these computations had a matrix size of 15 (chordwise) x 15 (spanwise) x 72 (azimuthal) points. Note the effect of varying the number of spanwise and azimuthal computational points away from this size. An increase in the number of azimuthal points from 50 to 144 and spanwise points from 10 to 20 results in very little difference in both the magnitude of the harmonics and the shape of the acoustic signature.

Execution Time

The execution time of the Farassat/Nystrom analysis (on the IBM 370/168) as a function of azimuthal and spanwise computational grid size is illustrated in Figure 5.

Program Limitations

Rotor blade spanwise airfoil section representation

Although this analysis allows the representation of a rotor blade whose chord and thickness vary in the spanwise direction, the analysis as modified by Sikorsky for helicopter applications currently accepts only one airfoil section type at a time. That is, only one type of thickness and/or camber distribution at a time may be used. This limitation should be removed for advanced aircraft that have multi-type airfoils. It should be noted that the S-76 rotor, which is of this type, was modelled in this study by using the section coordinates of the rotor's outboard airfoil (SC1095) section.

Input data smoothness

Input data (both rotor characteristics and input airload data) should be as smoothly faired as possible. If large variations in magnitude are real features of the data, the input data grid size selected should be fine enough to accurately represent these changes. If necessary the input data should be edited to smooth out discontinuities. Inclusion of such irregularities can cause unrealistic "sharp" spikes in the noise signature.

Harmonic content of the output

The harmonic content of the input airload data determines the harmonic content of the output data. Due to the linear interpolation method used in the azimuthal direction, the potential for introducing errors above a limiting harmonic exists. Table 8 summarizes the values of this limiting harmonic for the input airload data used in this study.

DESCRIPTION OF DATA BASES

Measured Input Airload Data Base

General

The measured input airload data is for the CH-53A main rotor at nominal flight speeds of 48.9 m/sec (95 kt) and 82.3 m/sec (160 kt). The data were obtained in 1969 utilizing the state of art measurement techniques available at that time. A detailed description of its acquisition is contained in Reference 5. Figure A-1 in Appendix A and Table 9 provide the characteristics of the CH-53A main rotor and Table 10 lists the flight conditions at which these data were taken.

Conversion to Input Format

The rotor blade used to obtain this data was instrumented with both absolute and differential pressure transducers located as shown on Figure 6. For use as input to the Farassat/Nystrom analysis, all pressure data were converted to differential pressure data. Complete pressure distributions using five chordwise stations were available at only a limited number of spanwise stations. (as seen in Figure 6) It was therefore necessary to use the single data points between the stations for which complete chordwise data existed to establish scaling factors for interpolation of additional chordwise data points in the spanwise direction. Further data was required forward of the 4.2% chord station at all spanwise stations. This was obtained by using an inviscid flow analysis based on Theodorsen (see Reference 6) as a means of estimating the pressures in the leading edge region. In this way, the data matrix for the F/N analysis was increased from 5 (chordwise) x 10 (spanwise) x 145 (azimuthal) measured points to 8 (chordwise) x 10 (spanwise) x 145 (azimuthal) input points.

Characteristics

Figures A-2 and A-3 in Appendix A include isometric plots of the resulting chordwise and spanwise pressure distribution over all six blades for a given azimuth position. Isometric plots of the chordwise and spanwise pressure distribution on blades at azimuth positions of 90 and 270 degrees, and chordwise pressure distributions for the 75 and 95% span stations at azimuth angles of 90 and 270 degrees for both airspeeds are also included in these figures. Analysis of the resulting measured data bases indicated several shortcomings, none of which are believed to influence the conclusions of this study. The overall integrated lift is approximately 30 - 40% less than the lift required to support the helicopter. To put this in the correct perspective, however, it must be realized that a 100% change in integrated lift would only produce a 6dB shift (acoustic doubling). Thus, a 30 - 40% decrease in lift would result in a corresponding decrease of from 2 - 3dB - and this only in the 1st harmonic loading component, assuming the thickness component were dominant. If, however, the loading component were dominant, the decrease would be noted in all loading harmonics.

In addition, the data exhibit some unexplained variations in loading. In particular sudden variations in the spanwise loading are seen to occur in Figures 7 and 8. Some of these variations could be due to the influence of vortices trailed from previous blades - or, they could be due to malfunctioning pressure transducers.

Predicted Input Airload Data Bases

General

The predicted airload input data consists of two sets - one for the CH-53A main rotor and one for the S-76 main rotor. The former was derived for nominal flight speeds of 48.9m/sec (95 kt) and 82.3m/sec (160 kt), the latter for flight speeds of 51.4m/sec (100 kt) and 72.02m/sec (140 kt). Each of these data sets was predicted using a flexible blade, variable inflow airload model. Additional data sets were also generated using other airload models for comparative purposes. A more detailed explanation of the airload models assumed and the process by which the data was predicted is provided in the next section and Appendix B. The process in summary, consists of the selection of a desired inflow model (constant or variable), the aeroelastic model (rigid or flexible) and the chordwise pressure prediction model (extended Theordorsen or TRANDES). These analyses were run in sequence for the particular combination of models desired to obtain the spanwise airloads and then the chordwise pressure distribution. Each data set was predicted in 5 degree intervals around the azimuth, resulting in a data matrix containing 15 chordwise x 15 spanwise x 73 azimuthal points. Figure A-4 through A-7 in Appendix A provide pressure distribution plots of the same type given for the measured data bases. Table 11 and Figure A-8 in Appendix A detail the geometric characteristics of the S-76 main rotor.

Comparison - Predicted and Measured Data Bases

Inspection of the pressure distribution plots for both the predicted and measured data reveals that overall, the predicted pressure data levels are higher than the corresponding measured data. As would be expected, this results in integrated values of lift much closer to the actual lift required to support the aircraft. Table 12 illustrates this fact. The measured data base lift deficiency mentioned in an earlier section is attributed to inaccuracies in the measurement process plus the scarcity of the measured data combined with the inability of the data enhancement techniques mentioned earlier to adequately compensate for the lack of available data. Figure 9 compares the integrated lift as a function of azimuth position for both the measured and predicted data bases for the 95 kt condition. A discussion of this comparison occurs in the next section. A listing of one example each of the measured and predicted airload data bases is provided in Appendix C.

Measured Acoustic Data Bases

CH-53 Data

The measured acoustic data used in this study was taken at Wallops Island, Va. in 1979. Detailed information regarding the recording equipment and conditions is summarized in Table 13.

Since this study is concerned only with main rotor noise correlation it was necessary to separate the main and tail rotor noise components. The original acoustic data due to the total aircraft system was recorded as analog signals on FM tape. This information was digitized and the results plotted. From these plots, the main rotor fundamental harmonic was identified and a prescribed number of multiples of this harmonic, both amplitude and phase angle, were extracted to obtain the main rotor noise from the measured acoustic data. The resulting values of amplitude and phase angle were used to generate the required acoustic time signature for comparison with the predictions from the Farassat/Nystrom analysis.

S-76 Data

This measured acoustic data were taken at West Palm Beach, Fla. in 1978. Detailed information regarding the recording equipment and conditions is summarized in Table 14. The procedures employed both to process the data and to prepare it for comparison to the Farassat/Nystrom output was the same as for the CH-53 data.

Acoustic Data Processing

All the acoustic data taken for both aircraft are recordings of the noise generated by the helicopters as they approached and passed over the observation point. In order to utilize this data in the format required, i.e., at observer distances forward of the noise source by 304.8m (1000 ft), 609.6m (2000 ft) and 1219.2m (4000 ft), it was necessary to add a time code to the recorded data. An audible tone on the recording indicates the point at which the aircraft was in the overhead position. Observer distances were therefore determined based on a knowledge of the average aircraft flight speed prior to the tone and the speed at which the data was being recorded on tape. The potential for some small error in quoted distance from the observer to the helicopter exists. When the data were processed, the observer distance was determined from the initiation of the beep. All data were taken on the centerline of the aircraft flight path.

Ground Reflection Corrections

The Farassat/Nystrom analysis output data are free field data. The measured acoustic data were taken utilizing a microphone mounted at the standard height above ground (1.219m (4 ft)) required by the FAA. Significant ground reflection effects are included in the measured test data for which corrections are required.

The methodology for the correction of acoustic data for ground reflection is still in the process of evolving (see References 7 and 8). Due to limitations in time and the availability of a developed methodology, an approximate correction was employed.

It was assumed that all ground reflection effects were due to reflected waves only, no account being taken of ground or surface waves. Further, it was assumed that the reflecting surface was a perfect reflector and that, given the proper positioning, the reflected waves could cause acoustic doubling, thus resulting in an increase in sound level of 6 dB. Figure 10 illustrates the geometry of the wave reflection process. In lieu of actually calculating the shape of the ground reflection noise increase as a function of frequency, it was assumed that the 6dB increase would be maintained to within 50% of the first minimum (cancellation) point, thereafter dropping off to zero at that minimum point and increasing to the full 6dB at a point halfway between the first and second minimum points. It was therefore only necessary to determine the locations of these minimum points and construct a correction curve which could be applied to the data. Figure 11 shows the correction curves employed. Note that this approximate correction assumes that the direct and reflected waves will only reinforce each other. In reality, both reinforcement and cancellation will occur, requiring correction factors ranging from +6dB to $-\infty$ dB instead of +6dB to 0. Note that the correction was carried out by subtracting the correction from the measured test data.

Table 15 lists the position of the minimum points as a function of blade passage frequency. Note that since the Farassat/Nystrom data correlation occurred in the frequency range from 0 to 300 Hz, at the 1219.2m (4000 ft) observation point, the first minimum was never reached.

Acoustic Data Base Plots

Figures 12 and 13 illustrate the processed total noise data for the CH-53A and S-76 respectively. The harmonics (amplitude and phase angle) illustrated are the fundamental harmonic of the rotor and its multiples. Figures 14 and 15 show main rotor harmonic spectra, both uncorrected and corrected for ground reflection, for the CH-53A and S-76. Figures 16 and 17, show the acoustic pressure signature plots, both uncorrected and corrected for ground reflection. Note the substantial changes of amplitude which can occur because of ground reflection. Harmonic spectra and acoustic signature plots for all observer positions and airspeeds for both aircraft are presented in Appendix D. Complete digitized listings of the above data are presented in Appendix E.

INPUT AIRLOAD SENSITIVITY STUDY

Purpose

The purpose of this study was to determine the sensitivity of the Farassat/ Nystrom analysis' acoustic predictions to predicted airload input models of varying degrees of sophistication. The more sophisticated models offer the potential for better representation of the harmonic content of blade airloads. The question to be answered is whether the noise predicted by the Farassat/Nystrom analysis will reflect this potentially more accurate harmonic content of airload input.

Technical Background - Predicted Rotor Airloads

General

Many studies have identified the analytic considerations which are important to the understanding and prediction of rotor airloads. Unlike fixed wings, helicopter rotors in steady state level flight are subject to oscillatory motions which periodically modify the blade aerodynamic environment and the resulting imparted airloads. These periodic motions arise as a result of the aerodynamic environment, the blade aeroelastic properties and the requirement to maintain rotor force and moment trim. The resultant airloads are, therefore, functions of rotor dynamic as well as aerodynamic behavior. The theories which have been developed and used by Sikorsky Aircraft and UTRC to analytically model imparted airloads combine the primary dynamic and aerodynamic mechanisms within a single analysis to produce the airload distribution. For clarity, the mechanisms are categorized as either dynamic or aerodynamic, but are highly interrelated and variations in one grouping strongly affect the other.

The major dynamic considerations are rotor shaft attitude, blade flapping response, and blade aeroelastic bending. These three responses effectively orient the rotor blade sections in space at a given time. When added to the rotor rotational, induced and forward flight velocities, they determine the total velocity field for each blade section. The rotor shaft angle and the blade flapping response can be combined and referred to as the rotor trim attitude.

Aeroelastic Blade Influence

The blade aeroelastic deflections further modify the blade section orientations and airloads from those that would be obtained on a trimmed rotor with rigid blades. This is caused by two primary mechanisms, the blade torsional deflections and blade flatwise bending, which vary with the azimuth angle of the blade and modify the angle of attack's time history. This change causes the rotor to seek a new trim attitude for force and moment balance. The manner in which that attitude is achieved is controlled by the dynamic behavior of the rotor system which determines the appropriate levels of shaft angle, blade flapping, and blade aeroelastic

bending consistent with the particular vertical lift and drag requirements of the aircraft.

Rotating Blade Aerodynamics

The aerodynamic influences on blade airload distribution, as compared to the dynamic mechanisms, are both more numerous and more complex. The most basic of these mechanisms is the periodically varying in-plane velocity distribution sensed by the rotor blade as it moves from the advancing side of the rotary disc to the retreating side. High local velocities are sensed as the blade advances in the direction of flight. Reduced local flow is experienced when the blade retreats from the direction of flight. The lift generated by an airfoil section operating at a constant lift coefficient is proportional to the square of the prevailing local velocity. Hence, the advancing blade is forced to operate at significantly lower angles of attack than the retreating blade if lateral moment trim is to be maintained. As a result, radial and chordwise airfoil pressure distributions on the advancing and retreating sides of the rotor disc differ considerably. The low angle of attack environment of the advancing side causes the lifting airloads to be developed primarily on the inboard blade sections. Conversely, the retreating blade airload distribution is weighted towards the tip. The inboard sections of the retreating blade are unable to sustain significant lift due to either small or reverse local in-plane velocities.

On rotary wings two parameters in addition to the instantaneous angle of attack must be considered in assessing local airfoil stall and resultant flow separation. These are flow skew angle and unsteady aerodynamics. The rotational flow component and the forward flight velocity component are only parallel at blade azimuth angles of 90° and 270°. At all other azimuth positions, the resultant flow component will skew relative to the local airfoil chordlines. Also, since the rotational flow component increases linearly with the distance of the local airfoil section from the center of rotation, the highest skew angles occur at the inner blade stations. These skew angles have the effect of extending the airfoil angle of attack range for which the local flow will remain attached and the airfoil unstalled. Unsteady aerodynamics exert a similar effect on rotary wing stall in that rapid angle of attack changes also tend to delay and suppress stall effects. In this case, oscillating angle of attack signatures due to the periodic inplane velocity fluctuation, aeroelastic blade bending, and vortex wake interference elevate the effective airfoil maximum lift coefficient.

Wake Induced Velocity Influence

The final aerodynamic consideration having a major impact on rotor airloads development is rotor induced downwash. All wings develop lift by imparting a downwash velocity component to the air passing in the vicinity of the lifting device. In the case of a rotary wing, this is a particularly important consideration since each blade is influenced by both its

own wake and the wake of the preceding blades. As such, varied and sophisticated analyses have been developed at UTRC and Sikorsky Aircraft to evaluate these effects. The simplest model assumes that the rotor disc is subject to a uniform downwash derived from momentum theory. Although this approach correctly accounts for large scale effects and involves little investment in computational time, it ignores radial and azimuthal downwash variations due to load distribution, finite blade effects and rotor wake interactions. This shortcoming is overcome by using a vortex wake model. This technique represents the blade lift distribution with a time varying bound vortex and uses trailing vortex filaments to assess the resulting downwash patterns. Using current technology, the trailing wake trajectories can be evaluated from either simple momentum theory (classical wake definitions) or from distorted wake analyses which model local wake distortions due to variations in the velocity field transporting the wake elements. Since wake distortions markedly increase the high frequency content of predicted airloads, the ability to accurately model them may be crucial to accurate rotor noise prediction.

Local Blade - Vortex Interaction

A mechanism which can have significant influence on the local blade airloading is the variation in normal velocities due to local blade-vortex interaction. For certain types of flight conditions the wake of the rotor can pass close to or actually strike the rotor disk. Because the wake of each blade consists of a strong tip vortex, modelled numerically by a discrete vortex filament, the airloading can be strongly affected when these conditions occur.

Chordwise Pressure Distribution

The difference in the chordwise pressure distributions developed on the advancing and retreating sides results from the variance in the blade angle of attack distributions combined with the Mach number variations. Advancing side chordwise pressures are characterized by weak leading edge suction peaks. Near the tip, shock discontinuities due to local sonic flow may exist. On the retreating side, the high local angles of attack cause high leading edge suction peaks. If the airfoil maximum lift coefficient is exceeded, the flow separates over the aft airfoil region. Again, prediction of Mach induced shock effects and regions of local separated flow require accurate airload methodology.

Input Airload Models Studied

The airload models chosen for representation were:

(1) Rigid blade, constant inflow
(2) Flexible blade, constant inflow
(3) Flexible blade, variable inflow
(4) Flexible blade, variable inflow with distorted wake

Input data sets based on the above models were calculated for the CH-53A at flight speeds of 49.54 m/sec (96.3 kt) and 81.69 m/sec (158.8 kt) and on models (2) and (3) for the S-76 at 51.4 m/sec (100 kt) and 72.02 m/sec (140 kt). It should be noted that model (4) was only applied to the low speed CH-53A condition. These input data sets were developed using a multi-step process illustrated in Figure 18 and explained more fully in Appendix B. Basically, however, the procedure involved calculating the spanwise loading distributions for the required operating conditions and then generating two-dimensional chordwise pressure distributions compatible with the spanwise loading using one of two methods. These were:

(1) The extended Theodorsen method
(2) TRANDES

The first is an inviscid, incompressible chordwise pressure analysis based on the work of Theodorsen (Reference 6) but incorporates modifications such as the addition of the Karman-Tsien compressibility correction to extend its usefulness.

The second, TRANDES (Reference 9) is a transonic compressible chordwise pressure analysis.

Input Airload Model Definition

The terminology used in describing the airload models listed previously is summarized below. The wake/inflow/airload models are depicted Figure 19.

Rigid blade

A rigid blade analysis is one in which the rotor blade model assumes no structural deformation in either the flapping or torsional directions.

Flexible blade

A flexible blade analysis assumes structural deformation in both the flapping and torsional directions. Because of the rotor blade's operating environment, these deformations occur periodically around the azimuth generating higher order harmonic airload fluctuations.

Constant inflow

Constant inflow refers to the fact that the induced velocity field assumed over the rotor disk is based on one average (constant) value calculated from simple momentum - actuator disk theory.

Variable inflow

Variable inflow refers to an induced velocity distribution (variable) across the rotor disk which is determined by solving for the local induced velocity at each point on the rotor disk using vortex theory. Such a

variable induced velocity, as in the case of the flexible blade model, gives rise to higher harmonic airload fluctuations.

Distorted wake

A distorted wake model is an alternate representation to the rotor wake assumed in the calculation of variable inflow rotor performance. The conventional representation used in such calculations is the classical wake which assumes that all elements of the wake move away from the rotor disk as one rigid unit. A distorted wake representation, on the other hand, allows individual wake elements to move relative to one another based on the velocities induced by their circulations.

Predicted Input Airload Models
Spanwise and Chordwise Loading Results

CH-53A: 48.9m/sec (95 kt) Condition

The rigid blade constant inflow results are not presented since they were not found to be significantly different than the equivalent flexible blade results for the conditions investigated. Figure 20 is a comparison of the integrated spanwise blade loading as a function of rotor azimuth position for the above noted models and the test results. These data were obtained by integrations of the pressure distributions either predicted by the analysis or obtained from measured test data. The loading results using the TRANDES analysis are not presented because they did not significantly differ from the extended Theodorsen results for this flight condition.

The classical wake variable inflow loading results are not significantly different than the constant inflow results although there are some indications of blade-vortex interaction at various azimuth positions. Comparison of these prediction with the test data are shown in Figure 20. Recognizing that the measured test results were significantly low in magnitude, the comparison shown herein may be questionable. However, there is some indication that the classical wake variable inflow model does improve the correlation with the test results as compared with the constant inflow prediction. The use of the distorted wake model yields significantly different loading distributions. These results are presented in a later section.

Figure 21 is a comparison of the pressure distributions at the 105 degree azimuth position as predicted using the extended Theodorsen analysis for the three different inflow models, and the TRANDES analysis for the variable inflow classical wake model. From this figure the differences in spanwise loading distribution are seen if it is recognized that the scales differ from one plot to the next on this figure. The distorted wake results (to be described later) are higher in magnitude due to strong upwash at for this azimuth position. It should be noted that there is no significant change in the character of the chordwise pressure distributions regardless of the inflow model used when using the extended Theodor-

sen model. Only the amplitudes appear to be affected by changing the inflow model. This is due in part to the fact that the chordwise pressure analysis is quasi-steady, does not recognize viscous phenomena at the higher angles of attack due to the distorted wake inflow, and that this analysis' local Mach number corrections do not significantly alter the solution. Thus the character of the pressure distributions primarily based on the inviscid procedure is not strongly affected by the blade vortex interaction. For the case using the TRANDES analysis, there are some significant differences in the character of the pressure distributions, noticeably in the tip region where the pressure distributions have indications of strong compressibility effects.

CH-53A: 82.3m/sec (160 kt) Condition

The same prediction models were run for the 82.3m/sec (160 kt) flight condition as for the 48.9m/sec (95 kt) case, with the exception of the distorted wake methodology. A comparison of constant and variable inflow airloading results was made and the predictions were found to be similar. The presence of some very weak blade-vortex interactions were noted near the 90 degree azimuth position.

The comparison of different pressure distributions solutions using different inflow and airfoil analyses is shown in Figure 22. These results are presented at a blade azimuth position of 90 degrees. For this flight condition, there were some noticeable differences between the use of the rigid versus elastic blade response model. This can be seen particularly in the tip region where the peak positive loading is greater for the flexible blade model than for the rigid blade model and the overall tip loading is more positive. The use of the classical wake variable inflow model shows little difference in loading distribution as compared with the constant inflow results. This is consistent with the general trending with azimuth position as noted above. Using the more sophisticated transonic chordwise pressure methodology (TRANDES) for this condition on the advancing blade tip region results in significant changes in the tip blade chordwise pressure loading distributions. The rearward displaced pressure spikes which are predicted to occur at this azimuth position are the results of compressibility influences felt strongly over the upper surface of the airfoil at this azimuth position.

S-76: General

The selection of the models to be applied to the S-76 aircraft was made based on the results of the application of the various predictive methodology models to the CH-53A. The extended Theodorsen chordwise pressure prediction analysis was used with both the constant inflow and classical wake variable inflow models. This selection was based on the lack of improved acoustic correlation when using either the distorted wake model or the compressible chordwise pressure prediction analysis (TRANDES) in the CH-53A application. Because it is recognized that the lack of improved correlation may not be due solely to the aerodynamic analyses, but

rather the combined methodologies, the classical wake variable inflow model was chosen in addition to the constant inflow model even though no significant acoustic prediction improvements were noted for the CH-53 application. The results of the application of this methodology to the S-76 aircraft are briefly presented in the sections below.

S-76: 51.4m/sec (100 kt) Condition

Selected results of the application of the methodology to the 51.4m/sec (100 kt) flight condition for the S-76 aircraft are shown in Figures 23 to 26. A comparison of the constant versus the variable inflow model results indicated that there are some blade-vortex interactions occuring for this flight condition which alter the character of the lift distribution. The use of the variable inflow resulted in loading distributions which have higher harmonic content than the constant inflow predictions as shown in Figure 23 for the 76.7% radial stations. This is directly attributable to the variable induced inflow used by the blade response analysis. The resulting predictions for chordwise pressure distributions are presented in Figures 24 and 25 for the rotor disk azimuthal quadrant definition positions (0, 90, 180, 270), based on the above loading results for the constant and variable inflow models respectively.

These pressure prediction distributions for the constant inflow model results (Figure 24) show a strong negative loading region on the advancing side of the rotor consistant with the blade loading results of Figure 23. The pressure distribution predictions for the variable inflow results (Figure 25) are similar to the constant inflow results with the exception that on the advancing side of the rotor the negative loadings do not occur. However, the character of these loadings on the advancing side are similar in shape to the constant inflow predictions. They exhibit the negative pressure loading on the leading edge region of the airfoil consistent with the general flow conditions at this azimuthal position (high Mach number), only the angle of attack is different due to the variable inflow model and resulting blade response.

S-76: 72.02m/sec (140 kt) Condition

For the 72.02m/sec (140 kt) condition the results (Figure 26) do not exhibit significant changes in character due to the use of variable inflow as was seen for the 51.4m/sec (100 kt) condition. This is due to the increased flight speed, which tends to reduce the number of potential blade vortex interactions, and the fact that the 72.02m/sec (140 kt) condition had a larger wake skew angle, thus increasing the axial displacement between the classical wake and the rotor disk.

The predictions for the pressure distributions based on the constant inflow results again show the negative loading in the tip region of the blade on the advancing side as was noted for the 51.4m/sec (100 kt) condition. In general the chordwise pressure distributions (constant or variable inflow) have the same characteristics in terms of azimuthal and spanwise variations as were exhibited in the 51.4m/sec (100 kt) case.

CH-53A: 49.8m/sec (95 kt) - Distorted Wake Sensitivity Study

A major limitation of current distorted wake analyses is the tendency for lifting-line-blade element response analyses based on quasi-steady aerodynamics to over-predict the lift response for close blade-vortex interactions. This phenomena has been recognized and studied by other investigators. Details of this over-prediction are seen in Figure 27, which compares predicted values of the blade flatwise aerodynamic loading as a function of azimuth position at one radial station. This high response is due to the large induced upwash on the rotor blade. From Figure 28, a plot of potential blade-tip vortex intersections at this flight speed, it can be seen that, at the 105 degree azimuth position, there are a large number of potential blade vortex interactions. Because this plot does not account for the axial position of the vortices with respect to the blade, an investigation of the relative blade and wake filament geometries was made to determine if actual interactions were occurring. The upwash is due to the accumulative effect of all of the near tip vortex filaments. However, the tip filament from the blade at 135 degrees azimuth position appears to be the most influential of these. At this azimuth position distances between the blade and tip vortices varies from one to five percent of the blade radius, with the closest interaction due to the above noted tip vortex. The same filament displacements from the blade using the classical wake model range from three to eight percent of the blade radius. Recognizing that the methodology currently in use for close blade-vortex interaction has many limitations in its application, the current distorted wake solution must be considered invalid for this condition.

Because of the large differences in predicted loading and acoustic response between the distorted wake methodology and the classical wake methodology prediction, a preliminary sensitivity study was made. The analysis of the distorted wake geometry and loading results as compared to the classical wake results indicated that for this condition there were a large number of close blade-vortex interactions occurring. To attempt to isolate and investigate each close blade-vortex interaction that occurred for this condition was beyond the scope of this activity. However, a simple global perturbation of the distorted wake geometry was possible. The inflow analysis was modified to include an axial displacement of the distorted tip vortex geometry dependent on wake age.

$$Z = Z + \Delta\lambda\psi_{age}$$

A value for the displacement inflow ratio ($\Delta\lambda$) was chosen which axially repositioned the distorted tip filament about half of the originally predicted tip distortion displacement after one blade spacing in wake age. Thus, the tip filaments of all blades would have displaced axially as a function of wake age and their corresponding influence reduced. The closest tip filament noted above at the 105 degree azimuth position was repositioned to about 2 percent of the blade radius from the blade. Figure 29 is a plot of the azimuthal variation in blade lift using the

original distorted wake compared with the blade lift using the repositioned distorted wake geometry. Notice that a significant reduction in the lift about the azimuthal position of 105 degrees has occurred. At other azimuthal locations, the lift response has generally been reduced in amplitude, but not nearly as significantly; in addition, shifts in the occurrence of the loading spikes are also noted. Clearly the impact of the wake distortion has been reduced and the sensitivity to axial position demonstrated. The induced velocity has been reduced in magnitude, but it still has a significant influence on the blade loading as shown in this figure. Apparently the repositioning of the distorted tip filaments has caused a significant overloading to be predicted at other radial and azimuthal locations. Careful study indicates that for the original distorted wake prediction, the close blade-vortex interaction was within the numerical core radius used in the analysis. The influence was not calculated because of the singular nature of the vortex influence. The repositioning of the tip vortex moved the filament out of the numerical core radius and thus the influence was included in the solution as shown in the figures. From this one wake geometry study at the 105 degree azimuth position, it can be concluded that the global repositioning of the tip vortex filaments has a significant effect. Thus a more intensive investigation should be carried out in the future.

The results of this brief wake sensitivity have indicated three questions concerning limitations of the current wake-blade response and pressure prediction methodologies. This flight condition being investigated, in combination with the six bladed rotor, has resulted in a large number of close blade-vortex interactions not always seen for the more conventional four bladed rotors studied in the past. The question of the necessity for accurate wake geometry predictions is raised because of the very strong predicted sensitivity of the blade-vortex interactions for close proximity conditions. The second question concerns the current lifting line - blade response analyses' ability to accurately predict the spanwise blade loading when a close blade-vortex interaction occurs. The final question concerns the ability of the two dimensional chordwise pressure prediction methodology to provide the correct pressure distributions due to such an interaction.

NOISE PREDICTION CORRELATION

It should be noted that unless otherwise specified, all correlations assume the observer to be positioned 609.6m (2000 ft) ahead of the helicopter on the centerline of the flight path and the helicopter to be at 152.4m (500 ft) altitude. In addition, as discussed previously, correlations of the harmonic spectra has been limited to the values of the harmonic specified in Table 8 for each input data set type. These values are 12 for the measured CH-53A airload input, 6 for the predicted CH-53A airload input, and 9 for the predicted S-76 airload input.

Results Using Measured CH-53A Airload Input

Figures 30 and 31 illustrate the predicted harmonic spectra and acoustic signatures for the measured CH-53A airload inputs as compared with the measured acoustic data at flight speeds of 48.9 m/sec (95 kt) and 82.3 m/sec (160 kt). As can be seen, the correlation of the harmonics for both flight speeds is poor. In Figure 30, the first 3 harmonics are underpredicted by 4 to 6 dB while the remaining harmonics are overpredicted. Furthermore, the amount of disagreement from harmonics 4 through 6 is substantial (approx. 20 dB). Improved ground reflection correction approximations are not expected to significantly improve the agreement shown. In Figure 31, (82.3 m/sec (160 kt)) the correlation is even worse, the 3rd harmonic being underpredicted by 30 dB while the 5th and higher harmonics are over predicted. The acoustic signature is equally unsatisfactory, although the 48.9 m/sec (95 kt) case correlates better than the higher speed case. For this speed 48.9 m/sec (95 kt) the width of the main pressure pulse is better matched to the measured results. In both cases large "spikes" are evident. These appear due to irregularities in the input airload data. Such irregularities may be inevitable to some degree in any set of measured pressure data. Subsequent analysis showed that reconstruction of the acoustic signatures using only the first several acoustic harmonics eliminates these spikes.

Results Using Predicted CH-53A Airload Input

Figures 32 through 37 show the harmonic spectra and acoustic signatures for the CH-53A main rotor at flight speeds of 48.9 m/sec (95 kt) and 82.3 m/sec (160 kt) for the airload input models listed earlier compared with the measured acoustic results. Examination of Figures 32 through 34 reveals little difference in the correlation of harmonic spectra obtained using either rigid or flexible blade constant inflow or flexible blade variable inflow airload models. Somewhat more noticeable changes are seen in the corresponding acoustic signatures however. Note that the main pressure pulse width and amplitude is slightly greater with the flexible blade constant inflow model (Figure 33) than with the rigid blade constant inflow model (Figure 32). Note also the difference between the flexible blade constant (Figure 33) and variable (Figure 34) inflow models is even

more pronounced. The peak immediately preceeding the main pulse is increasing in amplitude compared with the constant inflow results and a new secondary pulse occurs afterwards. This is attributable to the higher harmonic blade loading due to the classical wake variable inflow model affecting the chordwise pressure predictions used as input to the acoustic analysis. Figures 35 through 37 depict the variation in the harmonic spectra for a flight speed of 82.3 m/sec (160 kt). For this condition the correlation of the first several harmonics improves when the airload model changes from the rigid blade, constant inflow model (Figure 35) to the flexible blade, constant inflow (Figure 36) model. However the correlation at the lower harmonics decreases and the higher harmonics improves if the model is changed from the flexible blade, constant inflow (Figure 36) to the flexible blade, variable inflow (Figure 37) model. Comparison of the corresponding acoustic signatures reveals that for all three airload models the Farassat/Nystrom analysis substantially overpredicts the amplitude of the main pressure pulse. Of these however, the flexible blade results exhibit better and smoother predictions over most of the time interval than the rigid blade results. The use of the classical wake variable inflow input airload model (Figure 37) in the acoustic analysis indicates some reduction in pressure pulse amplitude as compared with the constant inflow results, with some change in character after the negative pulse, similar to the 48.9m/sec (95 kt) response. In addition, the overall correlation of the shape of the signature is not as good as that for the lower flight speed case.

Application of Distorted Wake Model to the 48.9m/sec (95 kt) case

The use of the distorted wake methodology as noted in an earlier section results in blade airload fluctuations which appear to be significantly overpredicted. Use of these results to obtain acoustic predictions results in significant overpredictions in terms of the harmonic spectra and the acoustic signature.

These overpredictions are due to the large number of close-blade vortex interactions occuring at this flight condition for this aircraft (6 blades). It should be recognized that the current state-of-the-art for close blade-vortex interactions for rotary wing application is in a primative stage compared with the other types of application. However some insight can still be gained from its application.

In order to determine the sensitivity of the acoustic results to modifications in the distorted wake model, a second model with a repositioned wake geometry was used. This revised model reflected a repositioning of the wake at approximately half the originally predicted distorted wake axial displacement at certain azimuth positions. In general this model displaces the tip vortex in such a manner that it is further away from the rotor disk. This repositioning should thus reduce the influence of the tip vortex. Figure 38 compares the results obtained with both the original and revised model. From this figure it is apparent that the

influence of the wake has been reduced. In particular, note that the 2nd and 5th harmonics are substantially reduced in magnitude. Note also, the large reduction in amplitude of the main pressure pulse and the pulses preceding and following it. The acoustic signature, however, is still significantly overpredicted compared to the classical wake, variable inflow model (Figure 37). Thus, if the blade-vortex interaction methodology was improved (reduced response due to close blade-vortex interactions) this model might become more valid than is currently indicated in the results.

Application of Transonic Chordwise Pressure Model to the 82.3m/sec (160 kt) case

Since the extended Theodorsen chordwise pressure analysis is basically an incompressible analysis, it was felt that it might not provide realistic pressure distributions for those circumstances where compressibility was an important factor. Accordingly, an 82.3 m/sec (160 kt) flexible blade variable inflow airload model using the TRANDES (Reference 9) analysis in place of the extended Theodorsen analysis was used. Figure 39 shows the results obtained using this airload input model. Note the "spikes". As before, these are thought to be caused by rapid variations in the input airload data. In this case such rapid changes in pressure can be expected to be predicted on the advancing blade as local areas of transonic flow occur. Such was the case at 105 degree azimuth position as shown in Figure 22 using the TRANDES analysis. More important than these spikes is a comparison of the results obtained both with and without the transonic chordwise pressure analysis. Figure 40 illustrates this comparison. Note that there are no real outstanding differences in either the harmonic spectra or acoustic signature. There are some changes in the character of the signature, particularly after the main pulse, but these are not appreciable. From these results it is apparent that the compressibility influences do not appear to be a dominant influence for this condition.

Relative Magnitudes of Thickness and Loading Components

As flight speed increases, the noise due to thickness is expected to grow in magnitude, particularly for observer positions forward of the rotor. Figures 41 and 42 are plots of the noise spectra and acoustic signatures of the individual noise components at 48.9 m/sec (95 kt) and 82.3 m/sec (160 kt) respectively. The cases used here for comparison were also previously discussed (see Figures 34 and 37) and assume a flexible blade, variable inflow airload input model. In Figure 42 note the dominance of the thickness component both in the signature and the harmonic spectra. Compare this with the relative magnitude of the components at 48.9 m/sec (95 kt) (Figure 41). Also at the higher speed, the thickness and loading components are more nearly out of phase than at the lower speed. Thus, small errors in component phasing could cause relatively large variations in the magnitude of the negative pressure peak.

The Effect of the Number of Acoustic Harmonics Representing the Acoustic Signature

Figure 43 is a comparison of the acoustic signatures calculated from the measured airload data and flexible blade variable inflow airload input data. Figure 44 is a similar comparison, however, in this instance the acoustic signature based on the measured airload input data is calculated using only the first 5 acoustic harmonics. Figures 45 and 46 illustrate the same comparison with the calculated signatures based on the measured airload input data reconstructed from 4 and 3 acoustic harmonics, respectively. Figure 47 is a plot of the calculated acoustic signature based on measured airload data reconstructed using 5 harmonics compared with the measured acoustic pressure data. These results show the effect of the number of acoustic harmonics used in the reconstruction of the predicted acoustic signature when high harmonic content (spikes) affects the calculation.

Along these same lines, it is of interest to determine how many harmonics are required to generate a typical acoustic signature. Figure 48 is a comparison of an acoustic signature as computed by the Farassat Analysis using flexible blade-variable inflow aerodynamics and consisting of 36 harmonics and the same signature as regenerated from the first 6 harmonics only. Note that the two signatures are quite similar in shape. Figures 49 thru 50 provide comparisons of the total and reconstructed (using 6 harmonics) acoustic signatures for all the predicted input airload models. From these results it is apparent that the first 6 harmonics largely determine the shape of the curve and the higher harmonics provide the finer details of the signature.

Airload Input Model Effects on Higher Harmonics

Although correlation of the higher harmonics (above 6 to 9) in the harmonic spectra has not been attempted because of the potential for interpolation error, it is of interest to determine the sensitivity of these spectra to the use of various airload models. Figures 51 thru 54 are comparison plots of the harmonic spectra for the various CH-53A airload models used at both flight speeds. In Figure 51 no consistent difference between the rigid blade and flexible blade, constant inflow models is evident. However, according to Figure 52, there is a significant difference in the higher harmonics generated by use of the flexible blade constant and classical wake variable inflow models.

Figure 53 shows a substantial reduction in the magnitude of the harmonic spectra (approximately 20 dB) generated using the flexible blade constant inflow model compared with the rigid blade constant inflow model at the high speed (82.3 m/sec (160 kt)) flight condition. Note, however, that there is no great difference between the spectra generated using the flexible blade constant and variable inflow models (Figure 54). These results are not unexpected, the rigid blade constant inflow airloading

harmonic content was found to be noticably different than the flexible blade results. The constant and variable inflow results were shown to be similar in Figure 22. Although the number of cases examined is limited, it appears that the choice of airload model can significantly alter the level of the higher harmonics of predicted noise. Furthermore, although the inclusion of blade flexibility and variable inflow intuitively would lead one to expect a greater level of higher harmonic activity such was not consistently observed.

Effect of Observer-Helicopter Distance on Correlation

An important aspect in determining the usefullness of the Farassat/Nystrom analysis is the determination of the effect of the distance between the observer and the noise source on the correlation. The observer-source distances studied were 304.8m (1000 ft), 609.6m (2000 ft) and 1219.2 (4000 ft). The helicopter was at 152.4m (500 ft) altitude and was flying at 48.9 m/sec (95 kt). The observer was located ahead of the helicopter and on the centerline of the flight path. The airload input data used was the flexible blade, variable inflow model.

Figures 55 through 57 illustrate the harmonic spectra distribution and the acoustic pressure signatures for the three observer positions. Note that as the distance from observer to noise source increases, the degree of correlation of the acoustic signature increases. At 304.8 m (1000 ft), the Farassat/ Nystrom analysis substantially overpredicts the magnitude of the main pressure pulse, at 609.6m (2000 ft) the pressure pulse is only slightly overpredicted, and at 1219.2 m (4000 ft) the pressure pulse is slightly underpredicted.

However a casual inspection of the harmonic spectra would indicate a decreasing correlation with increasing distances. Figure 58 superimposes these three signatures for comparison. This figure clearly shows the decay in the signature with increasing distance. Figure 59 through 61 are plots of the harmonic spectra and acoustic signatures of the separate components (thickness and loading noise) at these three positions. Note that at the nearer observer/ source distance (304.8 m (1000 ft)), the magnitude of the loading component is greater than the thickness component. Further, as the distance increases, the magnitude of the thickness component becomes equal to or greater than the loading component. This growth in importance of the thickness noise component (which is completely dominant in the plane of the rotor) is due to the movement of the observer closer to the plane of the rotor as the observer - source distance increases. Figure 62 illustrates the geometry involved and Table 16 lists the values of the angles between the rotor disk plane and observer for these particular cases.

S-76 Rotor Correlation Results

No measured airload input data exists for the S-76. It was therefore necessary to utilize predicted airload input data. Based on the experience gained from the correlation of the CH-53A rotor, two airload models were selected. These were the flexible blade constant and variable inflow models using the extended Theodorsen method to generate the chordwise pressures. The flight speeds studied were 51.4 m/sec (100 kt) and 71.9 m/sec (140 kt). The observer is located 609.6 m (2000 ft) ahead of the aircraft on the centerline of the flight path and the aircraft is at 152.4 m (500 ft) altitude. The limiting harmonic value as noted in Table 8 is 9 for the S-76. Figures 63 through 66 show the harmonic spectra and acoustic signature for the two airload models and flight speeds. For the lower speed case (Figures 63 and 64) the correlation between measured and predicted values of the harmonic spectra is considerably better for the variable inflow model (Figure 64) than for the constant inflow model (Figure 63). Interestingly enough, however, the acoustic signature obtained using the constant inflow model is better overall than that for the variable inflow model.

For the 71.9 m/sec (140 kt) case, correlation between measured and predicted values of the harmonic spectra is fair for both the constant and variable inflow models. (Figure 65 and 66). The acoustic pressure signature prediction based on the constant inflow methodology shows a significant overprediction of the general amplitude as compared with the test results. The character of the distinct pressure pulse seen in the test data is depicted by the analytical model, but the predicted amplitude is much too large. The use of the classical wake variable inflow model results in acoustic signature predictions which are reduced in amplitude as shown in Figure 66. In general the variable inflow acoustic signature is an improved prediction compared with the prediction based on the constant inflow results.

Concluding Remarks

Analyses such as the Farassat/Nystrom analysis can potentially be used in many ways. Obviously, the most desirable use is to provide absolute quantitative predictions for design purposes. The minimum requirement placed on an analysis is that it predict qualitative trends so that the effect of design changes from a known reference experimental base may be assessed. To form a preliminary assessment of the capabilities of the Farassat/Nystrom analysis, Figures 67 and 68 have been prepared and summarize the correlation results of this study. In Figure 67 the predicted and measured levels of the first harmonic of the acoustic signature are presented for the 6 rotor-flight condition-observer positions studied. Figure 68 presents predicted and measured average reduction in harmonic amplitudes with harmonic number.

The first harmonic amplitude is seen in Figure 67 to be predicted to within ±6 dB. The random scatter observer in this fundamental quantity leads one to believe that measurement inaccuracies are the likely cause of the differences rather than difficulties in the analysis. In addition, measured trends with observer distance, speed and rotor configuration are predicted with reasonable accuracy. Figure 68 shows that the average reduction in harmonic amplitude with harmonic number is predicted to within ±2 dB/harmonic for the conditions analyzed. This figure also shows (as might be expected) a less rapid falloff in harmonic amplitude for the CH-53 at 160 kts compared to that observed at 95 kts. In contrast the S-76 harmonic amplitude falloff is relatively constant for the two speeds. This probably reflects the improved aerodynamic design of the S-76 (airfoil, tip sweep and its lower advancing tip Mach number (.815 vs. 864 normal to radial axis).

The ability of the analysis to predict amplitudes of harmonics as well as is indicated in Figures 67 and 68 is encouraging considering the fact that the acoustic time histories are less well predicted. This is most likely due to the logarithmic amplitude scale being used and to the fact that harmonic phase angle correlation has not been required. It should be noted that harmonic amplitudes form the basis for most acoustic specifications and evaluations.

On the basis of these encouraging results it is recommended that further work be conducted using the analysis to predict the individual effects of all design variables of interest. In addition, another area which could potentially benefit from the use of this existing analysis is the prediction of tail rotor noise. The noise of the tail rotor lies in a higher and more critical frequency range than that of the main rotor. As a result the tail rotor contribution to overall helicopter noise can be of equal or greater importance than that of the main rotor. Thus, the accuracy of the Farassat/Nystrom analysis in the predictions of tail rotor noise should be determined.

Finally, only certain noise mechanisms are modelled in the current Farassat/ Nystrom analysis. Other mechanisms of potential importance to the prediction of helicopter noise that should be considered include:

(1) Non-linear (quadrupole) representation of transonic blade tip flow effects (see References 10 and 11).

(2) Rotor broadband noise

   (a) Random noise due to turbulent inflow
   (b) Rotor blade boundary layer trailing edge noise
   (c) Rotor blade vortex shedding noise.

CONCLUSIONS AND RESULTS

The following is a list of the more significant findings of this study:

1. The acoustic analysis using predicted airloads shows encouraging correlation with the available measured harmonics of main rotor noise for the six main rotor/flight conditions examined. Qualitative trends in harmonic amplitude with observer distance and rotor flight speed and configuration were predicted. The correlation was limited to the first six harmonics of blade passage for the CH-53A and the first nine for the S-76. The correlation on a harmonic basis was better than on a time history basis.

2. The acoustic analysis using measured airloads did not correlate well due to the presence of "discontinuities" in the predicted acoustic time history. These discontinuities are believed to be due to irregularities in the measured blade pressures or the fairing of the limited pressure data. When the discontinuities were arbitrarily removed, much better correlation resulted.

3. Correlation of the analysis with the measured amplitude of the 1st harmonic of blade passage frequency was generally poorer than anticipated. The discrepancies were not consistent and are probably due to measurement inaccuracies.

4. The inclusion of blade flexibility and variable inflow effects (based on a nondistorted wake) in the airloads analysis generally improved the agreement between predicted and measured acoustic results.

5. The predicted acoustic results showed a very strong sensitivity to wake distortions. Such distortions should not be included in the airload analysis without more appropriate modeling of blade-vortex interactions effects.

6. It is important to be able to identify ground reflection effects correctly and have available a technique for either adding ground reflection effects to free field results (such as from the Farassat/Nystrom Analysis) or subtracting them out of measured acoustic data to simulate free field results.

7. The Farassat/Nystrom analysis represents a valuable first step on the road to developing a truly comprehensive rotor noise prediction capability. The current code can be useful for investigating helicopter main rotor noise trends at the lower harmonics. With further refinements and the addition of more noise mechanisms, its capabilities could be greatly expanded.

RECOMMENDATIONS

1. The accuracy of the Farassat/Nystrom analysis in predicting tail rotor noise should be defined.

2. The acoustic analysis should be correlated with noise measurements acquired on other helicopters and for takeoff and approach flight conditions as well as the flyover conditions examined in this report.

3. Means for decreasing the computer time requirements of the Farassat/Nystrom analysis should be examined and for eliminating the sources of discontinuities in the predicted acoustic signature that sometimes occur.

4. The Farassat/Nystrom analysis should be applied in sensitivity studies to define the acoustic trends resulting from the variation of rotor design parameters.

5. A standardized ground reflection analysis should be developed.

6. The acoustic analysis should be correlated with data acquired in steady operating conditions and free of ground reflections. If possible, simultaneous measurements of blade pressures should be made.

7. An airloads/wake analysis capable of predicting the details of three dimensional airloading near the blade tip should be developed.

8. An airload/wake analysis capable of predicting the details of blade-vortex interaction should be developed and the effects of wake distortion on the predicted acoustic signature should be reassessed.

9. The effect of unsteady airfoil characteristics and fuselage flow field on predicted noise should be examined.

10. The Farassat/Nystrom acoustic analysis should be expanded to include other pertinent noise generating mechanisms as technology developments warrant. Emphasis should be placed on mechanisms applicable to anticipated certification flight conditions (takeoff, flyover, approach).

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FARASSAT INPUT DATA LIST

THE COORDINATE SYSTEM ON THE HELICOPTER IS DEFINED AS FOLLOWS: THE SPACE COORDINATES (X1,X2, AND X3) ARE A RIGHT-HANDED SYSTEM CENTERED AT THE ROTOR HUB. LOOKING DOWN AND FORWARD ON THE HELICOPTER, X1 IS POSITIVE FORWARD, X2 IS TO THE LEFT AND X3 IS UP, PERPENDICULAR TO THE GROUND. THE BLADE AZIMUTHAL ANGLE (PHI) IS MEASURED FROM THE -X1 AXIS IN A COUNTERCLOCKWISE DIRECTION AROUND THE X3 AXIS IN THE X1-X2 PLANE. IT SHOULD BE NOTED THAT IN THE EXPRESSIONS WHICH DESCRIBE THE VARIATION OF THE ANGLE OF ATTACK AND THE FLAPPING ANGLE, THE TERMS ARE ADDED RATHER THAN SUBTRACTED, I.E.

AA = AAE2 + AA0 + AAC * COS(PHI) + AAS * SIN(PHI) AND
PSI = PSI0 + PSIC * COS(PHI) + PSIS * SIN(PHI).

WHERE AAE2 IS THE SPANWISE DEPENDENT COMPONENT OF THE ANGLE OF ATTACK AS DEFINED BY THE INPUT SUBROUTINE FUNE2.

***NAMELIST INPUT

AA0	CONSTANT TERM IN THE EXPRESSION OF THE ANGLE OF ATTACK AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI). - 10. DEG
AAC	COEFFICIENT ON THE COSINE TERM IN THE EXPRESSION OF THE ANGLE OF ATTACK AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI). - 3. DEG
AAS	COEFFICIENT ON THE SINE TERM IN THE EXPRESSION OF THE ANGLE OF ATTACK AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI).- 3. DEG
ALPHAR	ROTOR ANGLE OF ATTACK, MEASURED FROM THE +X1 AXIS IN A CLOCKWISE DIRECTION AROUND THE -X2 AXIS IN THE X1-X3 PLANE. -3. DEG
C	LOCAL SPEED OF SOUND. - 340 M/SEC
CENTER	LOGICAL VARIABLE THAT WHEN .TRUE. ENABLES THE ROTATION OF THE PRESSURE SIGNATURES TO CENTER THE MAXIMUM EXCURSION IN THE OVERALL PRESSURE SIGNATURE. - .TRUE.
DOQUAD	TRANSITION POINT BETWEEN THE QUADRATIC (NLE) AND THE LINEAR (NTE) DIVISIONS ALONG THE CHORD EXPRESSED AS A FRACTION OF THE CHORD AS MEASURED FROM THE LEADING EDGE. - .10
EPSLON	MAXIMUM ALLOWABLE ERROR IN THE CALCULATION OF THE RETARDED TIME EXPRESSED AS A PERCENTAGE OF AN OBSERVER TIME STEP.-.5%
FULL	LOGICAL VARIABLE THAT WHEN .TRUE. ENABLES THE OUTPUT OF THE COMPONENT PRESSURE SIGNATURES AND SPECTRA. - .FALSE.
MOTION	LOGICAL VARIABLE THAT WHEN .TRUE. SIGNIFIES THAT THE OBSERVER IS FIXED WITH RESPECT TO THE HELICOPTER. - .FALSE.
NBLADE	NUMBER OF BLADES. - 2
NLE	NUMBER OF DIVISIONS ALONG THE CHORD FROM THE LEADING EDGE TO DOQUAD. THESE DIVISIONS ARE QUADRATICALLY SPACED. - 5
NPTS	NUMBER OF POINTS PER PERIOD BASED ON BLADE PASSAGE. THIS QUANTITY FORCED EVEN DOWNWARDS IF NECESSARY. - 50
NSPAN	NUMBER OF DIVISIONS ALONG THE SPAN. THESE DIVISIONS ARE SPACED SO AS TO CREATE EQUALLY SWEPT AREAS. - 20
NSPEC	NUMBER OF HARMONICS TO CALCULATE. FORCED TO BE LESS THAN HALF OF NPTS. - 10
NTE	NUMBER OF DIVISIONS ALONG THE CHORD FROM DOQUAD TO THE TRAILING EDGE. THESE DIVISIONS ARE LINEARLY SPACED. - 10
OBS	INITIAL POSITION OF THE OBSERVER WITH RESPECT TO THE X1,X2,X3 FRAME OF REFERENCE DESCRIBED ABOVE AT TZERO = 0. - (100.,0.,100.) M
PLOTS	LOGICAL VARIABLE THAT WHEN .TRUE. ENABLES THE PLOTTING OF THE PRESSURE SIGNATURES AND SPECTRA. - .TRUE.
PSI0	CONSTANT TERM IN THE EXPRESSION OF THE FLAPPING ANGLE AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI). - 2. DEG
PSIC	COEFFICIENT ON THE COSINE TERM IN THE EXPRESSION OF THE FLAPPING ANGLE AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI). - 10. DEG
PSIS	COEFFICIENT ON THE SINE TERM IN THE EXPRESSION OF THE FLAPPING ANGLE AS A FUNCTION OF THE BLADE AZIMUTHAL ANGLE (PHI). 10. DEG
R	OUTER BLADE RADIUS. - 5. M
REV	ROTATIONAL BLADE SPEED. - 300. RPM
RHO	LOCAL AIR DENSITY. - 1.234 KG/M**3
RINNER	INNER BLADE RADIUS. - 1. M
SAVE	LOGICAL VARIABLE THAT WHEN .TRUE. ENABLES THE WRITING OF THE RESULTS ON THE FILE ASSOCIATED WITH LOGICAL UNIT LSAVE.- .FALSE.
TZERO	STARTING OBSERVER TIME. - 0. SEC
VH	HELICOPTER VELOCITY. THE SECOND COMPONENT OF THE VELOCITY VECTOR IS ALWAYS ASSUMED TO BE ZERO. - (100.,0.,100.) M/SEC
ALTFAC	CORRECTION FACTOR FOR ALTITUDE ADJUSTMENT BETWEEN TEST ALTITUDE AND ACOUSTIC MEASURING POINT DEFAULT=1.0

CARD IMAGE (NO DEFAULTS)

IDENT	TWELVE CHARACTER IDENTIFIER, COLUMNS 1-12.
****	FNAME NOT REQUIRED FOR IBM VERSION ******
FNAME	EIGHT CHARACTER FILE NAME TO BE USED IF SAVE = .TRUE.. NOTE: BLANKS IN THE FILE NAME ARE REMOVED, COLUMNS 11-20

***ROTOR BLADE CHARACTERISTICS INPUT

THE CONFIGURATION DATA INPUT FOLLOWING THE TITLE CARD IS ORGANIZED INTO 6 SMALLER DATA SUBSETS, AS FOLLOWS:

1. BLADE SECTION THICKNESS DISTRIBUTION AS A FUNCTION OF NON-DIMENSIONAL BLADE CHORD(X/C). BLADE THICKNESS IS THE SYMMETRICAL SECTION Y/C NORMALIZED BY THE MAXIMUM SECTION T/C.

2. BLADE CAMBER DISTRIBUTION AS A FUNCTION OF NON-DIMENSIONAL BLADE CHORD(X/C). BLADE CAMBER IS THE CAMBER(YC/C) NORMALIZED BY THE MAXIMUM SECTION T/C.

3. BLADE TWIST DISTRIBUTION AS A FUNCTION OF NON-DIMENSIONAL RADIUS(R/R). BLADE TWIST IS IN DEGREES.

4. BLADE CHORD AS A FUNCTION OF NON-DIMENSIONAL RADIUS(R/R). BLADE CHORD IS IN METERS.

5. LEADING EDGE DISPLACEMENT(LED) AS A FUNCTION OF NON-DIMENSIONAL RADIUS(R/R). LED IS THE LOCATION OF THE BLADE LEADING EDGE RELATIVE TO THE BLADE COLLECTIVE PITCH AXIS,EXPRESSED IN METERS. BY CONVENTION THIS VALUE IS EXPRESSED AS A NEGATIVE NUMBER.

6. BLADE MAXIMUM THICKNESS RATIO AS A FUNCTION OF NON-DIMENSIONAL RADIUS(R/R).

Table 1. - Farassat/Nystrom analysis input.

NOTE: ALL CURVES MUST BE LOADED - AND IN THE ORDER SHOWN.

THESE INPUTS ARE LOADED IN STANDARD FREE-FIELD LOADER FORMAT. WITH THIS TYPE OF FORMAT, THE INPUT IS SPECIFIED AS A STRING OF DIGITS DELINEATED BY COMMAS,VIZ:

N,M,X,X2, ...XN

WHERE:

N (INTEGER) IS THE NUMBER OF DATA INPUTS SPECIFIED PER CARD

M (INTEGER) IS THE LOCATION NUMBER OF THE FIRST DATA INPUT PER CARD

X,....XN (FLOATING POINT) ARE THE INPUT DATA

A DEFINITION OF THE INPUT LOCATION NUMBERS AS USED IN EACH OF THE SIX DATA SUBSETS IS AS FOLLOWS:

LOCATION	DEFINITION
1	NUMBER OF POINTS IN X-Y ARRAY
2*	SLOPE OF CURVE AT FIRST INPUT POINT
3*	SLOPE OF CURVE AT LAST INPUT POINT
4-23	NON-DIMENSIONAL CHORD OR SPAN INPUTS
24-43	CORRESPONDING Y VALUE FOR LOC. 4-23

NOTE: A MINUS(-) SIGN MUST BE INCLUDED IN COLUMN 1 ON THE LAST CARD OF EACH DATA SET.

*THE PROGRAM IS DESIGNED TO ACCEPT AND USE THE INTIAL AND FINAL SLOPES OF THE CURVE PASSED. IF THE SLOPES ARE NOT KNOWN SET LOCATION 2 TO 0.0 AND THE PROGRAM WILL DETERMINE THESE VALUES FROM A SPLINE FIT EQUATION.

Table 1. - (Concluded)

```
 $INPUT AA0=9.17, AAC=1.89, AAS=-4.44, ALPHAR=3.15,
 C=350.3, CENTER=.TRUE., DOQUAD=0.05, EPSLON=0.5, FULL=.TRUE.,
 MOTION=.FALSE., NBLADE=4,
 NLE=5, NPTS=72, NSPAN=20, NSPEC=36, NTE=10,
 OBS=609.6,0.,-152.4,
 PLOTS=.TRUE.,
 PSI0=4.361, PSIC=0.385, PSIS=-0.653,
 R=6.7056, REV=292.99, RHO=1.1452, RINNER=1.2204
 SAVE=.FALSE., TZERO=0., VH=51.48,0.,0.  $END
S76FV1
-----------------------------------------------/
3,1,20.,0.0,0.0                                |
7,4,0.,.006,.008,.012,.026,.05,.06             |          1
6,11,.07,.10,.14,.17,.25,.29                   |     AIRFOIL THICKNESS
7,17,.39,.49,.59,.69,.77,.87,1.0               |       DISTRIBUTION
5,24,0.,.1121,.1318,.1655,.2519                |         F(X/C)
5,29,.3428,.3680,.3882,.4279,.4573             |
5,34,.4745,.4984,.4980,.4756                   |
-5,38,.4415,.3919,.3146,.2341,.1323,0.0        |
-----------------------------------------------/
3,1,20.,0.,0.                                  |
7,4,0.,.006,.008,.012,.026,.05,.06             |          2
6,11,.07,.10,.14,.17,.25,.29                   |       AIRFOIL CAMBER
7,17,.39,.49,.55,.65,.71,.81,1.0               |       DISTRIBUTION
5,24,0.0,.00998,.0122,.0163,.0284              |         F(X/C)
5,29,.0439,.0491,.0536,.0643,.0740             |
5,34,.0791,.0855,.0847,.0804,.0732             |
-5,39,.0674,.05415,.04352,.02688,0.            |
-----------------------------------------------/          3
2,1,1.,-10.                                    |       BLADE TWIST
-1,24,0.                                       |         F(R/R)
-----------------------------------------------/
3,1,19.,0.,0.                                  |
10,4,0.,.182,.20,.22,.316,.38,.4,.48,.5,.55    |          4
9,14,.65,.75,.795,.833,.892,.90,.95,.951,1.0   |       BLADE CHORD
7,24,.3975,.3975,.3975,.3975,.3975,.3975,.3975 |         F(R/R)
6,31,.3975,.3975,.3975,.3975,.3975,.3975       |
-6,37,.3938,.3938,.3938,.3938,.3938,.2374      |
-----------------------------------------------/
3,1,19.,0.,0.                                  |
10,4,0.,.182,.20,.22,.316,.38,.4,.48,.5,.55    |          5
9,14,.65,.75,.795,.833,.892,.90,.95,.951,1.0   |       LEADING EDGE
5,24,-.09938,-.09938,-.09938,-.09938,-.09938   |       DISPLACEMENT
5,29,-.09938,-.09938,-.09938,-.09938,-.09938   |         F(R/R)
5,34,-.09938,-.09938,-.09938,-.09845,-.09845   |
-4,39,-.09845,-.09845,-.09845,.05795           |
-----------------------------------------------/
3,1,18.,0.0,0.0                                |
9,4,0.,.05,.10,.15,.182,.2,.22,.316,.38        |          6
9,13,.4,.48,.5,.55,.65,.892,.90,.95,1.0        |       BLADE MAX T/C
5,24,.13,.13,.13,.13,.13                       |       DISTRIBUTION
4,29,.1276,.125,.1125,.1041                    |         F(R/R)
5,33,.1015,.095,.095,.095,.095|                |
-4,38,.095,.095,.095,.095                      |
-----------------------------------------------/
```

Table 2. - Typical Farassat/Nystrom analysis rotor characteristics and operating conditions input data.

```
                PRESSURE DATA INPUT

     DATA MUST BE SET UP IN THE FOLLOWING FORMAT:

CARD 1:       FOUR INPUT ITEMS:   4I4 FORMAT
              1; NUMBER OF SPANWISE STATIONS (I)
              2; NUMBER OF CHORDWISE STATIONS (J)
              3; NUMBER PF AZIMUTHAL STATIONS (K)
              4; INTERPOLATION TYPE: 0 - SPLINE (L)
                                     1 - LINEAR

CARD 2-N:     THE I SPANWISE STATIONS (NON-DIMENSIONAL),5F12.4 FORMAT,
              15 MAXIMUM. DO NOT INCLUDE THE TIP (R/R=1).

CARD N+1-NN: THE J CHORDWISE STATIONS (NON-DIMENSIONAL) 5F12.4 FORMAT,
              15 MAXIMUM. DO NOT INCLUDE THE LEADING OR TRAILING EDGE.

THE PROGRAM ASSUMES THAT THE AZIMUTH ANGLES ARE EVENLY SPACED AT
360./(K-1) DEGREES/ THE VALUE OF K MUST INCLUDE 0 AND 360 DEGREES.
K MAY HAVE A VALUE OF 145.


CAUTION: THE PRODUCT OF I*J*K CANNOT EXCEED 16,425


THE PROGRAM WILL PROCESS THIS DATA SET BASED ON THE INTERPOLATION
TYPE SPECIFIED ON CARD 1,INPUT 4(L). THE DEFAULT IS A SPLINE FIT
IF NOT SPECIFIED, ALTHOUGH THE PROGRAM WILL OVERRIDE THE L OPTION
AND PROVIDE A LINEAR INTERPOLATION IF THE NUMBER OF SPANWISE OR
CHORDWISE LOCATIONS EXCEED 9. THE AZIMUTHAL DATA WILL DEFAULT TO
A LINEAR FIT IF K.GT.50, INDEPENDENT OF THE INTERPOLATION SCHEME
USED FOR CHORDWISE AND/OR SPANWISE VARIATIONS.
```

Table 3. - Farassat/Nystrom analysis input airload data list.

```
15  15  73   1
-------------------------------------------------------------------------------
     .1053      .1785      .2290      .3010      .3830  SPANWISE STATIONS
     .4430      .4940      .5465      .5955      .6445    (R/R)
     .7060      .7985      .8830      .9410      .9850
-------------------------------------------------------------------------------
     .0020      .0100      .0260      .0500      .0820  CHORDWISE STATIONS
     .1450      .2350      .3250      .4150      .5050    (X/C)
     .5950      .6850      .7750      .8650      .9550
-------------------------------------------------------------------------------
   -11.0500   -306.5000  3670.0000 11299.9999 18439.9998  DIFF. PRESSURE(PA)
 28029.9998 37859.9995 47639.9995 52689.9995 54699.9995  AZIMUTH POSITION 1
 44809.9995 43569.9995 36619.9995 34059.9995 38879.9995    (X/C)1
-------------------------------------------------------------------------------
   -38.6400   -741.5000  3704.0000 10539.9999 16969.9998
 25409.9998 34399.9995 43799.9995 49889.9995 53479.9995    (X/C)2
 46699.9995 46549.9995 40389.9995 35219.9995 39989.9995
-------------------------------------------------------------------------------
   -17.7800   -460.4000  3208.0000  9039.9999 14509.9999
 21619.9998 29179.9998 37119.9995 42509.9995 46019.9995    (X/C)3
 41379.9995 42019.9995 38139.9995 31009.9998 35129.9995
-------------------------------------------------------------------------------
   -10.0500   -349.2000  2817.0000  7840.9999 12559.9999
 18699.9998 25259.9998 32209.9995 37119.9995 40529.9995    (X/C)4
 37159.9995 38189.9995 35559.9995 27679.9998 31329.9995
-------------------------------------------------------------------------------
    -.3237   -204.9000  2270.0000  6176.9999  9860.9999
 14619.9999 19719.9998 25149.9998 29119.9998 31989.9995    (X/C)5
 29979.9998 31159.9998 29859.9998 22359.9998 25209.9998
-------------------------------------------------------------------------------
    2.6540   -117.0000  1596.0000  4275.9999  6799.9999
 10029.9999 13489.9999 17169.9998 19879.9998 21869.9998    (X/C)6
 20719.9998 21619.9998 20969.9998 15539.9998 17459.9998
-------------------------------------------------------------------------------
    3.0050    -75.8300  1168.0000  3104.0000  4925.9999
  7251.9999  9737.9999 12379.9999 14339.9999 15789.9999    (X/C)7
 15039.9999 15719.9998 15349.9999 11319.9999 12689.9999
-------------------------------------------------------------------------------
    2.0460    -60.3200   889.8000  2365.0000  3750.0000
  5514.9999  7394.9999  9351.9999 10849.9999 11929.9999    (X/C)8
 11349.9999 11849.9999 11529.9999  8561.9999  9592.9999
-------------------------------------------------------------------------------
    1.7850    -47.4400   717.9000  1904.0000  3018.0000
  4433.9999  5940.9999  7532.9999  8709.9999  9573.9999    (X/C)9
  9115.9999  9514.9999  9269.9999  6885.9999  7710.9999
-------------------------------------------------------------------------------
    1.8690    -36.3200   603.3000  1593.0000  2523.0000
  3705.0000  4964.9999  6296.9999  7286.9999  8017.9999    (X/C)10
  7659.9999  8008.9999  7835.9999  5787.9999  6476.9999
-------------------------------------------------------------------------------
    1.4140    -30.4200   488.7000  1291.0000  2045.0000
  3002.0000  4021.0000  5095.9999  5891.9999  6477.9999    (X/C)11
  6180.9999  6455.9999  6303.9999  4674.9999  5230.9999
-------------------------------------------------------------------------------
     .1645    -30.4500   354.6000   951.4000  1508.0000
  2214.0000  2958.0000  3737.0000  4296.9999  4694.9999    (X/C)12
  4415.9999  4572.9999  4378.9999  3352.0000  3755.0000
-------------------------------------------------------------------------------
    -.5313    -27.4200   246.3000   671.7000  1065.0000
  1564.0000  2085.0000  2625.0000  3060.0000  3256.0000    (X/C)13
  3016.0000  3093.0000  2898.0000  2298.0000  2577.0000
-------------------------------------------------------------------------------
    -.4381    -19.3900   167.5000   457.9000   725.7000
  1065.0000  1419.0000  1783.0000  2034.0000  2203.0000    (X/C)14
  2033.0000  2080.0000  1938.0000  1553.0000  1741.0000
-------------------------------------------------------------------------------
    -.5572    -12.1600    74.8300   210.6000   334.3000
   491.1000   652.0000   815.0000   920.9000   986.2000    (X/C)15
   885.1000   889.7000   794.2000   679.7000   764.3000
-------------------------------------------------------------------------------
   -20.4900   -277.8000  4320.9999 12409.9999 19159.9998
 27699.9998 36689.9995 44999.9995 48209.9995 49299.9995  AZIMUTH POSITION 2
 39249.9995 38879.9995 31979.9995 28719.9998 32019.9995        |
   -78.9000  -706.3000  4375.9999 11689.9999 17929.9998        |
 25779.9998 34299.9995 42709.9995 47279.9995 49879.9995        |
 41979.9995 42319.9995 35389.9995 30519.9998 34019.9995     ETC.,ETC.
   -34.3600  -407.8000  3793.0000 10019.9999 15339.9999
```

Table 4. - Farassat/Nystrom analysis - typical input airload data.

HELICOPTER DATA SHEET

95KT,FV1

INPUT PARAMETERS

C = 339.7 M/SEC RHO = 1.2073 KG/M**3

OBS = (609.60, 0.0 , -152.40) M STATIONARY
VH = (49.5, 0., 0.0) M/SEC REV = 189.2 RPM

RINNER = 2.963 M R = 10.973 M NBLADE = 6

NSPAN = 20 ALTFAC= 1.000 ALPHAR = 3.90 DEG
NLE = 5 NTE = 10 DOQUAD = 0.0500

TZERO = 0.0 SEC
NPTS = 144 NSPEC = 72 EPSLON = 0.5000 %

AA0 = 7.10 DEG AAC = -3.29 DEG AAS = 2.48 DEG
PSI0 = 4.11 DEG PSIC = -1.11 DEG PSIS = -0.16 DEG

OUTPUT PARAMETERS

DT = 0.315 MSEC PERIOD = 45.376 MSEC BPF = 18.92 HZ

TORQUE = 23218. N-M THRUST = 24251. N (PER BLADE QUANTITIES,
POWER = 460. KW POWER = 617. HP TIME AVERAGED.)

RMNO = 0.640 VMNO = 0.146

OASPL = 79.5 DB RE 20 MICROPA
DUE TO THICKNESS = 79.1 DB RE 20 MICROPA
DUE TO LOADING = 80.6 DB RE 20 MICROPA

F. FARASSAT -- P. NYSTROM
JIAFS -- GWU -- NASA/LARC
NOISE TECHNOLOGY BRANCH

PRESSURE SIGNATURES OF NOISE COMPONENTS

95KT,FV1

POINT NUMBER	THICKNESS NOISE (PA)	LOADING NOISE FAR FIELD (PA)	LOADING NOISE NEAR FIELD (PA)	LOADING NOISE COMBINED (PA)	OVERALL NOISE (PA)
1	0.1359	-0.0041	0.0038	-0.0003	0.1356
2	0.1365	0.0036	0.0038	0.0074	0.1439
3	0.1370	0.0102	0.0038	0.0139	0.1510
4	0.1375	0.0161	0.0038	0.0199	0.1574
5	0.1378	0.0227	0.0038	0.0265	0.1642
6	0.1379	0.0265	0.0038	0.0303	0.1682
7	0.1378	0.0291	0.0038	0.0329	0.1706
8	0.1374	0.0392	0.0038	0.0430	0.1804
9	0.1369	0.0488	0.0038	0.0526	0.1895
10	0.1361	0.0585	0.0038	0.0623	0.1984
11	0.1350	0.0681	0.0038	0.0720	0.2070
12	0.1335	0.0786	0.0038	0.0825	0.2160
13	0.1317	0.0909	0.0038	0.0947	0.2265
14	0.1294	0.1010	0.0038	0.1048	0.2343
15	0.1266	0.1058	0.0039	0.1096	0.2362
16	0.1232	0.1144	0.0039	0.1183	0.2415
17	0.1193	0.1224	0.0039	0.1263	0.2456
18	0.1146	0.1316	0.0039	0.1355	0.2501
19	0.1090	0.1448	0.0039	0.1488	0.2578
20	0.1026	0.1613	0.0040	0.1652	0.2678
21	0.0953	0.1764	0.0040	0.1804	0.2756
22	0.0868	0.1933	0.0040	0.1978	0.2846
23	0.0772	0.2117	0.0040	0.2157	0.2930
24	0.0664	0.2266	0.0041	0.2306	0.2970
25	0.0541	0.2409	0.0041	0.2449	0.2990
26	0.0403	0.2537	0.0041	0.2578	0.2981
27	0.0248	0.2685	0.0042	0.2727	0.2974
28	0.0078	0.2829	0.0042	0.2871	0.2949
29	-0.0113	0.2987	0.0042	0.3030	0.2916
30	-0.0320	0.3163	0.0043	0.3206	0.2885
31	-0.0546	0.3333	0.0043	0.3377	0.2831
32	-0.0792	0.3502	0.0044	0.3546	0.2754
33	-0.1055	0.3690	0.0044	0.3734	0.2679
34	-0.1331	0.3921	0.0045	0.3966	0.2635
35	-0.1624	0.4080	0.0046	0.4125	0.2501
36	-0.1932	0.4193	0.0046	0.4239	0.2307
37	-0.2243	0.4297	0.0047	0.4344	0.2101
38	-0.2555	0.4400	0.0047	0.4448	0.1892
39	-0.2864	0.4476	0.0048	0.4524	0.1660
40	-0.3162	0.4533	0.0049	0.4582	0.1420
41	-0.3444	0.4633	0.0049	0.4682	0.1238
42	-0.3700	0.4674	0.0050	0.4724	0.1024
43	-0.3923	0.4605	0.0051	0.4656	0.0733
44	-0.4110	0.4279	0.0051	0.4330	0.0220
45	-0.4253	0.4045	0.0052	0.4097	-0.0156
46	-0.4348	0.3858	0.0053	0.3910	-0.0437
47	-0.4393	0.3668	0.0053	0.3721	-0.0672
48	-0.4387	0.3240	0.0054	0.3294	-0.1093
49	-0.4332	0.2663	0.0054	0.2717	-0.1615
50	-0.4229	0.2168	0.0055	0.2222	-0.2007

Table 5. - Typical Farassat/Nystrom analysis output data.

51	-0.4084	0.1682	0.0055	0.1737	-0.2347
52	-0.3909	0.1291	0.0055	0.1346	-0.2562
53	-0.3698	0.0853	0.0055	0.0908	-0.2790
54	-0.3460	0.0316	0.0055	0.0372	-0.3088
55	-0.3208	-0.0253	0.0055	-0.0198	-0.3406
56	-0.2942	-0.0703	0.0055	-0.0648	-0.3590
57	-0.2680	-0.1055	0.0055	-0.1000	-0.3660
58	-0.2415	-0.1364	0.0055	-0.1308	-0.3724
59	-0.2153	-0.1644	0.0055	-0.1590	-0.3743
60	-0.1900	-0.1861	0.0055	-0.1807	-0.3707
61	-0.1661	-0.2040	0.0054	-0.1985	-0.3647
62	-0.1434	-0.2108	0.0054	-0.2054	-0.3489
63	-0.1221	-0.2104	0.0054	-0.2051	-0.3271
64	-0.1021	-0.2116	0.0053	-0.2062	-0.3083
65	-0.0838	-0.2096	0.0053	-0.2042	-0.2881
66	-0.0673	-0.1997	0.0053	-0.1944	-0.2617
67	-0.0516	-0.1859	0.0053	-0.1807	-0.2323
68	-0.0376	-0.1723	0.0052	-0.1670	-0.2046
69	-0.0247	-0.1585	0.0052	-0.1533	-0.1780
70	-0.0131	-0.1445	0.0052	-0.1394	-0.1525
71	-0.0027	-0.1334	0.0052	-0.1282	-0.1309
72	0.0067	-0.1189	0.0051	-0.1138	-0.1070
73	0.0151	-0.1073	0.0051	-0.1022	-0.0871
74	0.0228	-0.0969	0.0051	-0.0918	-0.0690
75	0.0298	-0.0849	0.0051	-0.0798	-0.0501
76	0.0359	-0.0738	0.0051	-0.0687	-0.0328
77	0.0414	-0.0657	0.0051	-0.0607	-0.0192
78	0.0464	-0.0581	0.0051	-0.0530	-0.0066
79	0.0508	-0.0551	0.0051	-0.0501	0.0007
80	0.0550	-0.0589	0.0051	-0.0538	0.0012
81	0.0587	-0.0631	0.0050	-0.0580	0.0007
82	0.0620	-0.0677	0.0050	-0.0627	-0.0006
83	0.0649	-0.0716	0.0050	-0.0666	-0.0017
84	0.0677	-0.0769	0.0050	-0.0719	-0.0042
85	0.0701	-0.0822	0.0050	-0.0772	-0.0070
86	0.0723	-0.0884	0.0050	-0.0834	-0.0111
87	0.0744	-0.0970	0.0050	-0.0920	-0.0176
88	0.0764	-0.1076	0.0050	-0.1026	-0.0262
89	0.0781	-0.1173	0.0050	-0.1124	-0.0343
90	0.0797	-0.1294	0.0049	-0.1244	-0.0447
91	0.0812	-0.1413	0.0049	-0.1364	-0.0552
92	0.0826	-0.1525	0.0049	-0.1476	-0.0650
93	0.0839	-0.1620	0.0049	-0.1572	-0.0733
94	0.0851	-0.1715	0.0048	-0.1666	-0.0815
95	0.0862	-0.1803	0.0048	-0.1755	-0.0893
96	0.0873	-0.1887	0.0048	-0.1839	-0.0966
97	0.0884	-0.1955	0.0048	-0.1907	-0.1023
98	0.0893	-0.2025	0.0047	-0.1978	-0.1085
99	0.0903	-0.2064	0.0047	-0.2017	-0.1113
100	0.0914	-0.2088	0.0047	-0.2041	-0.1127
101	0.0923	-0.2153	0.0046	-0.2107	-0.1184
102	0.0932	-0.2195	0.0046	-0.2149	-0.1217
103	0.0941	-0.2226	0.0046	-0.2181	-0.1239
104	0.0950	-0.2255	0.0046	-0.2209	-0.1259
105	0.0959	-0.2249	0.0045	-0.2203	-0.1244
106	0.0968	-0.2262	0.0045	-0.2217	-0.1249
107	0.0976	-0.2264	0.0045	-0.2219	-0.1243
108	0.0985	-0.2237	0.0044	-0.2193	-0.1207
109	0.0995	-0.2143	0.0044	-0.2099	-0.1104
110	0.1005	-0.2078	0.0044	-0.2034	-0.1030
111	0.1012	-0.2017	0.0043	-0.1974	-0.0962
112	0.1021	-0.1971	0.0043	-0.1928	-0.0907
113	0.1031	-0.1926	0.0043	-0.1884	-0.0853
114	0.1041	-0.1882	0.0042	-0.1840	-0.0799
115	0.1050	-0.1823	0.0042	-0.1781	-0.0731
116	0.1060	-0.1782	0.0042	-0.1740	-0.0681
117	0.1069	-0.1723	0.0042	-0.1681	-0.0612
118	0.1078	-0.1681	0.0041	-0.1640	-0.0562
119	0.1088	-0.1576	0.0041	-0.1535	-0.0446
120	0.1100	-0.1479	0.0041	-0.1438	-0.0338
121	0.1111	-0.1381	0.0041	-0.1341	-0.0230
122	0.1121	-0.1295	0.0040	-0.1255	-0.0134
123	0.1131	-0.1223	0.0040	-0.1183	-0.0052
124	0.1141	-0.1167	0.0040	-0.1127	0.0015
125	0.1152	-0.1100	0.0040	-0.1060	0.0092
126	0.1163	-0.1041	0.0040	-0.1001	0.0162
127	0.1174	-0.1005	0.0040	-0.0965	0.0209
128	0.1186	-0.0963	0.0039	-0.0923	0.0263
129	0.1197	-0.0913	0.0039	-0.0873	0.0323
130	0.1208	-0.0859	0.0039	-0.0820	0.0388
131	0.1219	-0.0780	0.0039	-0.0741	0.0478
132	0.1231	-0.0722	0.0039	-0.0683	0.0548
133	0.1242	-0.0668	0.0039	-0.0649	0.0593
134	0.1254	-0.0616	0.0039	-0.0577	0.0677
135	0.1265	-0.0578	0.0039	-0.0539	0.0726
136	0.1277	-0.0530	0.0039	-0.0491	0.0785
137	0.1288	-0.0465	0.0038	-0.0426	0.0862
138	0.1299	-0.0416	0.0038	-0.0377	0.0921
139	0.1309	-0.0378	0.0038	-0.0340	0.0970
140	0.1319	-0.0328	0.0038	-0.0290	0.1029
141	0.1329	-0.0291	0.0038	-0.0252	0.1077
142	0.1339	-0.0239	0.0038	-0.0201	0.1138
143	0.1348	-0.0147	0.0038	-0.0109	0.1238
144	0.1356	-0.0093	0.0038	-0.0055	0.1302
145	0.1363	-0.0029	0.0038	0.0009	0.1373

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Table 5. - (Continued)

PRESSURE SPECTRA OF NOISE COMPONENTS

95KT,FV1

HARMONIC NUMBER	FREQUENCY (HZ)	OVERALL LEVEL (DB RE 20 UPA)	OVERALL PHASE (DEG)	THICKNESS LEVEL (DB)	THICKNESS PHASE (DEG)	LOADING LEVEL (DB)	LOADING PHASE (DEG)
1	18.92	76.6	66.2	76.7	144.1	78.6	14.6
2	37.84	73.2	-7.3	73.0	36.1	70.5	-74.0
3	56.76	71.0	-149.2	67.4	-75.9	71.3	172.7
4	75.68	62.6	57.9	61.1	171.1	66.3	27.8
5	94.60	53.6	-82.4	54.3	57.6	59.4	-103.2
6	113.52	45.9	128.6	47.1	-56.0	52.5	126.1
7	132.44	39.5	6.1	39.7	-169.7	45.6	8.2
8	151.36	31.1	-113.1	32.0	76.7	37.6	-107.9
9	170.28	23.8	144.6	24.0	-39.3	29.9	142.6
10	189.20	30.6	-154.3	14.7	-153.4	29.1	-154.5
11	208.12	18.8	-162.0	5.0	79.7	19.7	-152.6
12	227.04	31.7	18.8	-15.5	-49.1	31.7	19.0
13	245.96	39.1	85.4	-2.3	12.9	39.1	85.9
14	264.88	28.9	25.2	-13.0	-140.5	29.0	25.4
15	283.80	31.0	-33.0	-9.3	-85.4	31.0	-32.6
16	302.72	31.9	-98.0	-18.1	174.2	31.9	-97.8
17	321.64	26.6	42.0	-18.3	-175.8	26.7	41.8
18	340.56	23.5	-138.7	-3.7	95.4	23.7	-136.7
19	359.48	25.7	13.7	-4.4	-2.2	25.4	14.2
20	378.40	26.0	-119.0	-0.3	-149.5	25.6	-117.6
21	397.32	27.4	138.2	-1.6	126.0	27.1	138.7
22	416.24	31.5	52.2	1.2	-67.6	31.6	53.7
23	435.16	32.1	-58.6	-6.3	120.6	32.2	-58.7
24	454.08	32.3	-177.2	-9.0	9.7	32.4	-177.2
25	473.00	33.6	76.3	-9.8	-176.3	33.6	75.9
26	491.92	31.3	-58.0	0.4	167.9	31.5	-56.8
27	510.84	34.5	-149.0	-1.8	23.3	34.6	-149.1
28	529.76	31.2	54.0	-0.5	-76.6	31.3	55.1
29	548.68	28.3	-61.1	0.1	149.9	28.6	-60.0
30	567.60	31.6	178.5	-9.2	1.1	31.6	178.5
31	586.52	24.7	81.5	-4.0	-125.9	25.0	80.5
32	605.44	22.4	-11.5	-3.2	60.0	22.2	-14.4
33	624.36	23.0	-131.5	-4.6	-109.4	22.6	-132.4
34	643.28	24.4	152.6	0.9	145.2	23.8	153.1
35	662.20	23.7	44.6	0.6	-3.3	23.3	47.7
36	681.12	20.9	-43.6	-9.2	-161.5	21.1	-42.1
37	700.04	15.9	-155.1	-12.1	61.4	16.2	-153.8
38	718.96	14.4	129.1	-8.5	-145.2	14.4	125.0
39	737.88	21.6	35.7	-13.2	76.1	21.5	35.0
40	756.80	19.9	-49.0	-2.1	-55.0	19.2	-48.5
41	775.72	10.3	-100.9	-6.0	137.2	11.0	-94.1
42	794.64	21.4	-161.4	-16.3	-151.7	21.3	-161.6
43	813.56	7.1	-70.7	-3.9	175.9	8.3	-57.7
44	832.48	17.2	4.8	-4.0	40.2	16.6	1.7
45	851.40	22.1	163.0	-7.2	-24.3	22.4	162.8
46	870.32	17.6	97.5	-0.5	-160.6	17.9	90.7
47	889.24	26.2	-59.9	-13.8	95.6	26.3	-60.2
48	908.16	21.9	-169.8	-14.3	14.2	22.1	-169.7
49	927.08	22.3	21.1	-16.2	-87.1	22.3	21.8
50	946.00	26.1	-51.1	-8.4	38.4	26.1	-52.2
51	964.92	18.1	-109.8	-5.2	-150.0	17.7	-107.2
52	983.84	20.9	129.7	-1.4	114.2	20.3	131.0
53	1002.76	18.6	-17.6	-3.5	-22.2	17.9	-17.2
54	1021.68	15.6	145.9	-4.8	-160.0	15.1	141.2
55	1040.60	11.3	-74.2	-13.0	56.9	11.7	-76.7
56	1059.52	24.5	87.5	-9.9	-108.4	24.7	87.2
57	1078.44	20.8	24.3	-10.6	76.3	20.7	23.0
58	1097.36	10.4	-56.2	-13.8	147.4	10.9	-54.9
59	1116.28	29.4	-77.4	-8.1	-26.5	29.3	-78.0
60	1135.20	24.8	-25.3	-13.4	92.3	24.8	-25.9
61	1154.12	16.7	134.3	-1.7	-72.9	17.6	131.4
62	1173.04	21.1	132.2	5.6	159.7	19.8	127.0
63	1191.96	16.4	-78.8	14.3	42.7	20.3	-104.3
64	1210.88	21.9	140.1	22.7	-75.5	27.9	121.5
65	1229.80	29.5	8.7	30.2	169.7	35.8	-1.2
66	1248.72	35.7	-123.6	37.6	55.9	42.7	-123.9
67	1267.64	44.0	82.5	44.7	-57.7	49.9	103.3
68	1286.56	52.9	-58.1	51.5	-171.1	56.7	-27.7
69	1305.48	61.5	149.1	57.9	75.9	61.7	-172.7
70	1324.40	63.7	7.1	63.5	-36.1	60.9	73.9
71	1343.32	67.0	-66.1	67.1	-144.1	69.1	-14.6
72	1362.24	42.4	-90.0	18.4	-90.0	41.8	-90.0

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OUTPUT DATA HAS BEEN WRITTEN TO UNIT 19
IN THE FOLLOWING ORDER:

1. O/A PRESSURE SIGNATURE
2. O/A HARMONIC DATA
3. THICKNESS NOISE PRESSURE SIGNATURE
4. O/A LOADING NOISE PRESSURE SIGNATURE
5. NEAR FIELD LOADING NOISE PRESSURE SIGNATURE
6. FAR FIELD LOADING NOISE PRESSURE SIGNATURE
7. THICKNESS NOISE HARMONIC DATA
8. O/A LOADING NOISE HARMONIC DATA
9. O/A NOISE PHASE ANGLES
10. THICKNESS NOISE PHASE ANGLES
11. LOADING NOISE PHASE ANGLES

Table 5. - (Concluded)

TABLE 6. MISCELLANEOUS TERMINOLOGY USED BY FARASSAT/NYSTROM ANALYSIS

DT	-	Incremental time into which PERIOD is divided for computation	-	$\frac{60}{NBL*REV*NPTS}$
PERIOD	-	Time period during which a blade makes one complete revolution	-	NPTS * DT
BPF	-	Blade passage frequency	-	$\frac{REV}{60} * NBL$
RMNO	-	Rotor advancing blade tip Mach No.		
VMNO	-	Vehicle flight Mach No.		

TABLE 7. EQUIVALENT ROTOR POSITION AND CONTROL ANGLES

Farassat/Nystrom Input Parameter	Conventional Helicopter Terminology	Sign of F/N Input Relative to Conventional Helicopter Notation	Function
ALPHAR (deg)	α_{TPP} - tip path plane angle	opposite	rotor position
PSIO (deg)	a_o - coning angle	same	rotor position
PSIC (deg)	a_{1S} - longitudinal blade flapping angle	opposite	rotor position
PSIS (deg)	b_{1S} - lateral blade flapping angle	opposite	rotor position
AAO (deg)	θ_{75} - collective pitch angle	same	rotor control
AAC (deg)	A_{1S} - lateral cyclic pitch angle	opposite	rotor control
AAS (deg)	β_{1S} - longitudinal cyclic pitch angle	opposite	rotor control

TABLE 8. LIMITING HARMONIC FOR INPUT AIRLOAD DATA

Accuracy of computation of loading noise component depends on accuracy of input airload data.

Current F/N analysis as modified by Sikorsky uses linear interpolation between successive azimuthal points.

Thus, computed results above harmonic N_{limit} are subject to error, where:

$$N_{limit} = \frac{N_{AZDP}}{N_{BL} \times 2}$$

N_{AZDP} = No. of azimuthal data pts

N_{BL} = No. of rotor blades

Values of N_{limit} for measured and computed airload input data used in this study are as follows:

Input Data Set	N_{AZDP}	N_{limit}
Measured CH-53A	144	12
Computed CH-53A	72	6
Computed S-76	72	9

TABLE 9. CH-53A ROTOR CHARACTERISTICS

Rotor diameter	21.946m (72 ft)
Blade chord	.6605m (2.167 ft)
Airfoil section	Modified NACA 0011
Blade number	6
Solidity ratio ($bc/\pi R$)	.1150
Blade twist (theoretical)	-6^{o}
Root cutout (η_2/R)	.27
Hinge offset	.6096m (2.0 ft)
Articulation	Full flapping and lag

TABLE 10. MEASURED AIRLOAD DATA BASE FLIGHT CONDITIONS

	Data Base 1		Data Base 2	
V	49.54m/sec	(96.3 kt)	81.69m/sec	(158.8 kt)
V_{TIP}	217.41m/sec	(713.3 fps)	218.45m/sec	(716.7 fps)
μ		.227		.377
LIFT	151,461 N	(34050 lb)	147,102 N	(33070 lb)
PROPULSIVE FORCE	8220 N	(1848 lb)	22,348 N	(5024 lb)
POWER	1677 kw	(2250 hp)	3781 kw	(5070 hp)
α_s	-2.9		-6.3	
θ_{75}	7.1		12.2	
A_{1S}	3.29		5.33	
β_{1S}	-2.48		-9.61	
a_o	4.11		4.29	
a_{1S}	1.11		-.57	
b_{1S}	0.16		-.07	

A_{1S} - lateral cyclic pitch

B_{1S} - longitudinal cyclic pitch

a_{1S} - longitudinal flapping

b_{1S} - lateral flapping

NOTE: Airload data used is averaged over 10-14 blade revolutions during the data reduction process.

TABLE 11. S-76 ROTOR CHARACTERISTICS

Rotor diameter	13.41m (44 ft)
Blade chord	.3938m (1.292 ft)
Airfoil section	Sikorsky SC1095/SC1095R8
Blade Number	4
Solidity ratio ($bc/\pi R$)	.0748
Blade twist (theoretical)	-10^{o}
Root cutout (η_2/R)	.182
Hinge offset	.253m (0.83 ft)
Articulation	Full flapping and lag

TABLE 12. CH-53A DATA BASE INTEGRATED LIFT COMPARISON

Flight Speed	Helicopter Lift	Measured Data Base Integrated Lift	Predicted Data Base Integrated Lift
49.54m/sec (96.3 kt)	151,461 N (34,050 lb)	106,633 N (23,972 lb)	150,812 N (33,904 lb)
81.69m/sec (158.8 kt)	147,102 N (33,070 lb)	89,787 N (20,185 lb)	146,253 N (32,879 lb)

TABLE 13. MEASURED ACOUSTIC DATA RECORDING CONDITIONS (CH-53A)

Microphone location and orientation	Centerline of flight path
Microphone height above ground	1.219m (4 ft)
Source (aircraft) height above ground	152.4m (500 ft)
Type of surface over which data was taken	Asphalt
Wind speed	1.03m/sec (2 kt) - 4.63 m/sec (9 kt)
Atmospheric conditions	25°C (77°F), 87% relative humidity
Recording equipment	Nagra Model SJ-4 recorder using ¼ inch width magnetic tape at 7.5 in/sec

TABLE 14. MEASURED ACOUSTIC DATA RECORDING CONDITIONS (S-76)

Microphone location and orientation	Centerline of flight path
Microphone height above ground	1.219m (4 ft)
Source (aircraft) height above ground	152.4m (500 ft)
Type of surface over which data was taken	Asphalt
Wind speed	No greater than 5.14m/sec (10 kt)
Atmospheric conditions	31.1^{o}C (88^{o}F)
Recording equipment	Nagra Model SJ-4 recorder using ¼ inch width magnetic tape at 7.5 in/sec

TABLE 15. GROUND REFLECTION WAVE CANCELLATION FREQUENCIES

Minimum Pt No \ Distance to Observer	304.8m (1000 ft)	609.6m (2000 ft)	1219.2m (4000 ft)
	BPF Frequency	BPF Frequency	BPF Frequency
1	156 Hz	288 Hz	564 Hz
2	313 Hz	577 Hz	1128.7 Hz
3	469 Hz	865 Hz	-
4	626 Hz	-	-

TABLE 16. ROTOR DISK PLANE/OBSERVER ANGLE AS A FUNCTION OF OBSERVER/SOURCE DISTANCE

Distance to Observer	γ_{HOR}	γ_{OS}	γ_{OSC}
304.8m (1000 ft)	1.32^{o}	26.57^{o}	27.89^{o}
609.6m (2000 ft)	1.32^{o}	14.04^{o}	15.36^{o}
1219.2m (4000 ft)	1.32^{o}	7.13^{o}	8.45^{o}

$$\beta = a_o - a_1 \cos \psi - b_1 \psi$$

$$\gamma_{HOR} = \alpha_S + \beta_{180}$$

$$\gamma_{OSC} = \gamma_{OS} + \gamma_{HOR}$$

THE ACOUSTIC FORMULATION

A SOLUTION OF THE FFOWCS WILLIAMS - HAWKINGS EQUATION

$$p'(\vec{x},t) = \frac{1}{4\pi}\frac{\partial}{\partial t}\int_{BLADES}\left[\frac{\rho_0 V_n}{r|1-M_r|}\right]_{ret}dS + \frac{1}{4\pi C}\frac{\partial}{\partial t}\int_{BLADES}\left[\frac{l_r}{r|1-M_r|}\right]_{ret}dS + \frac{1}{4\pi}\int_{BLADES}\left[\frac{l_r}{r^2|1-M_r|}\right]_{ret}dS$$

THICKNESS NOISE — FAR-FIELD LOADING NOISE — NEAR-FIELD LOADING NOISE

$l_r = \Delta p n_i r_i$

$M_r = V_i \hat{r}_{i/c}$

$\vec{x}$ = OBSERVER POSITION VECTOR

$\hat{r}_i$ = UNIT VECTOR ALONG RADIATION DIRECTION

$\vec{n}$ = LOCAL UNIT OUTWARD NORMAL ON BLADE SURFACE

r = DISTANCE BETWEEN SOURCE AND OBSERVER

V_n = LOCAL NORMAL VELOCITY ON BLADE

V_i = LOCAL BLADE VELOCITY

dS = ELEMENT OF BLADE SURFACE AREA,

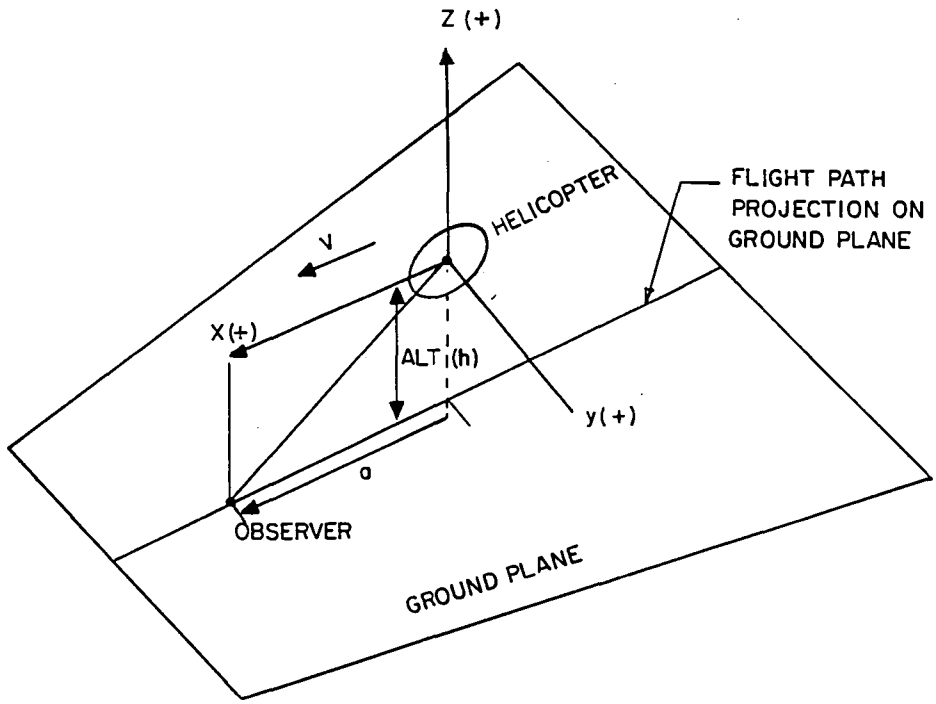
Δp = LOCAL DIFFERENTIAL PRESSURE

C = SPEED OF SOUND

ρ_0 = AMBIENT ATMOSPHERIC DENSITY

Figure 1.

ROTOR/OBSERVER
SPATIAL ORIENTATION



COORDINATES OF OBSERVER
IN THIS CASE ARE:

$(x,y,z) = (a, o, -h)$

Figure 2.

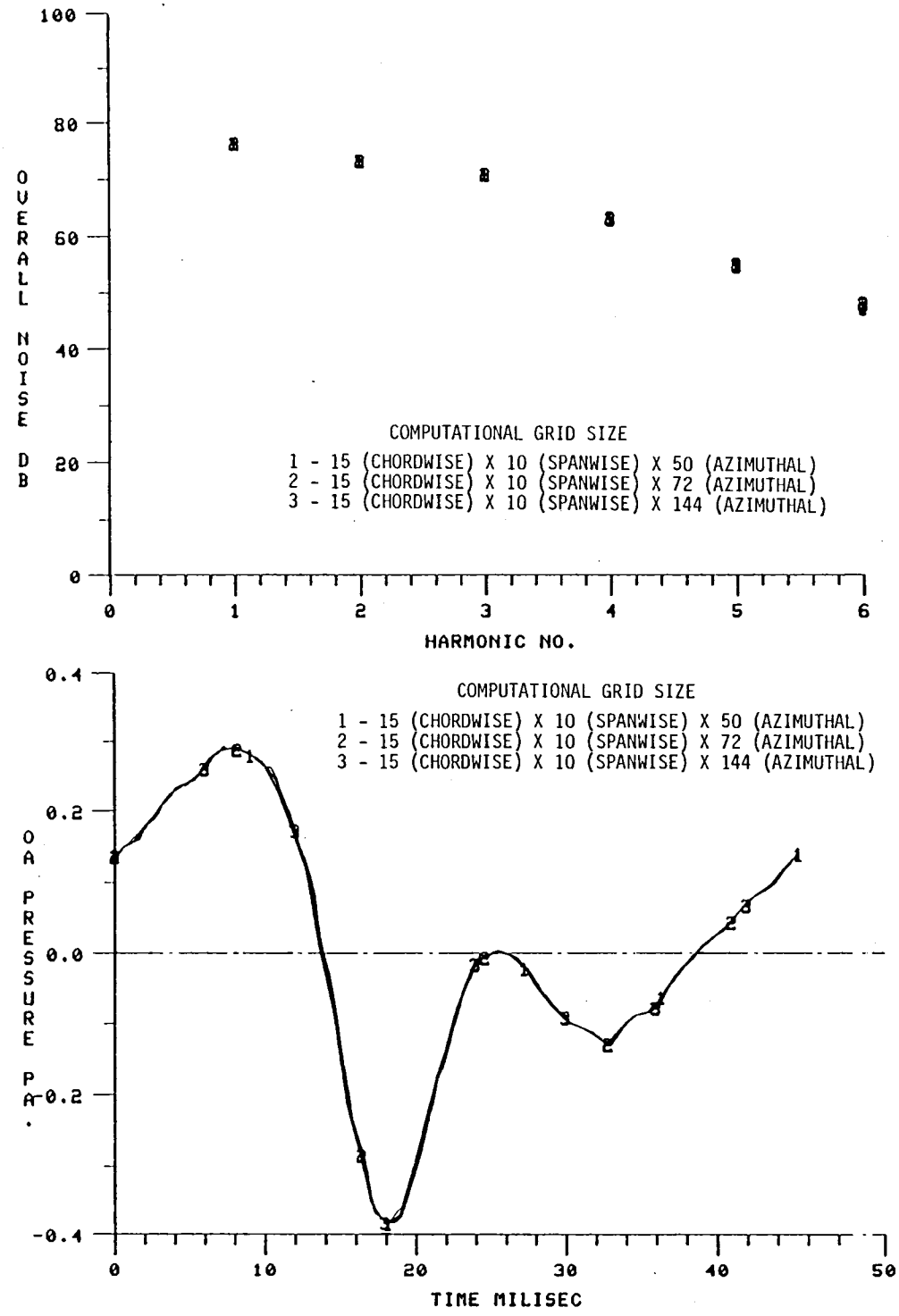


Figure 3. - Comparison of theoretical acoustic pressure signatures and spectra obtained using various size computational grids. V = 48.9 m/sec (95 kt).

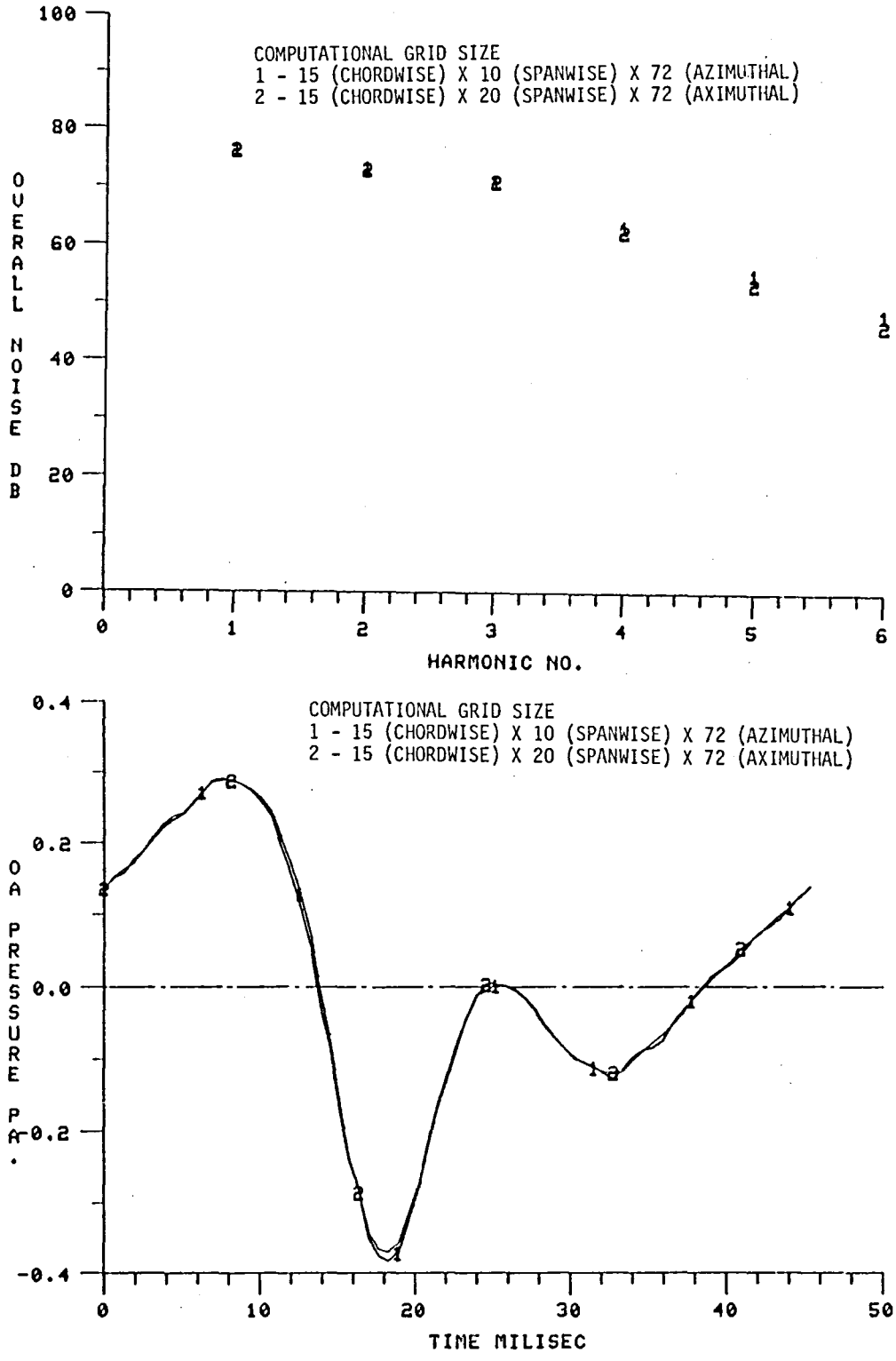


Figure 4. - Helicopter Altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (200 ft) ahead of helicopter.

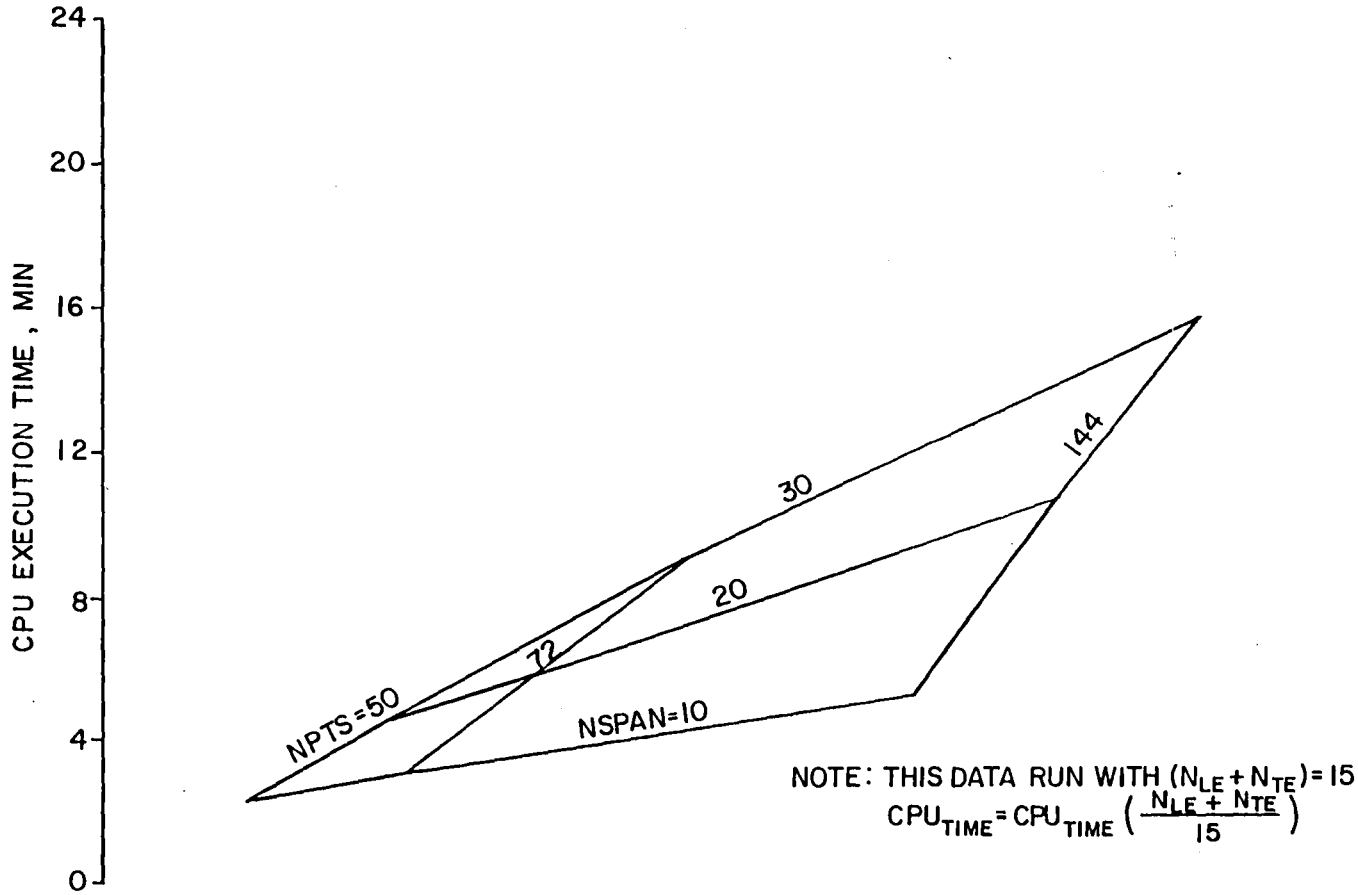


Figure 5. - Farassat/Nystrom analysis execution time.

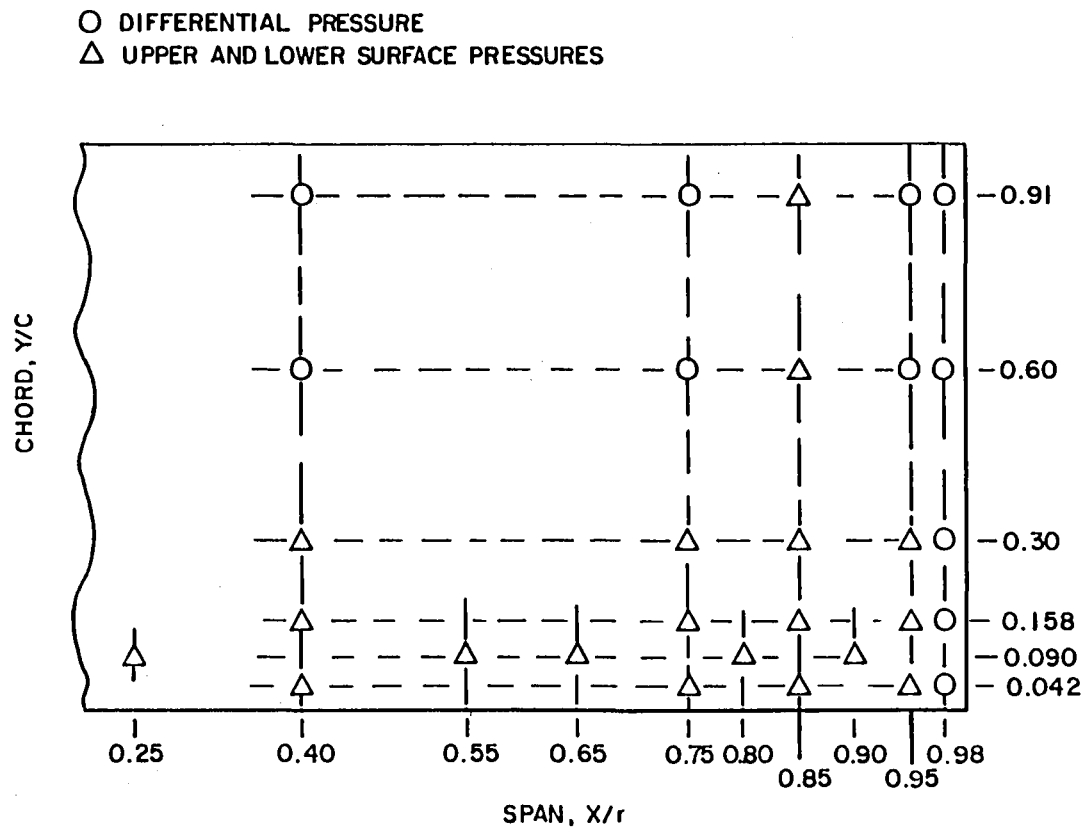


Figure 6. - Location of pressure transducers on CH-53A rotor blade.

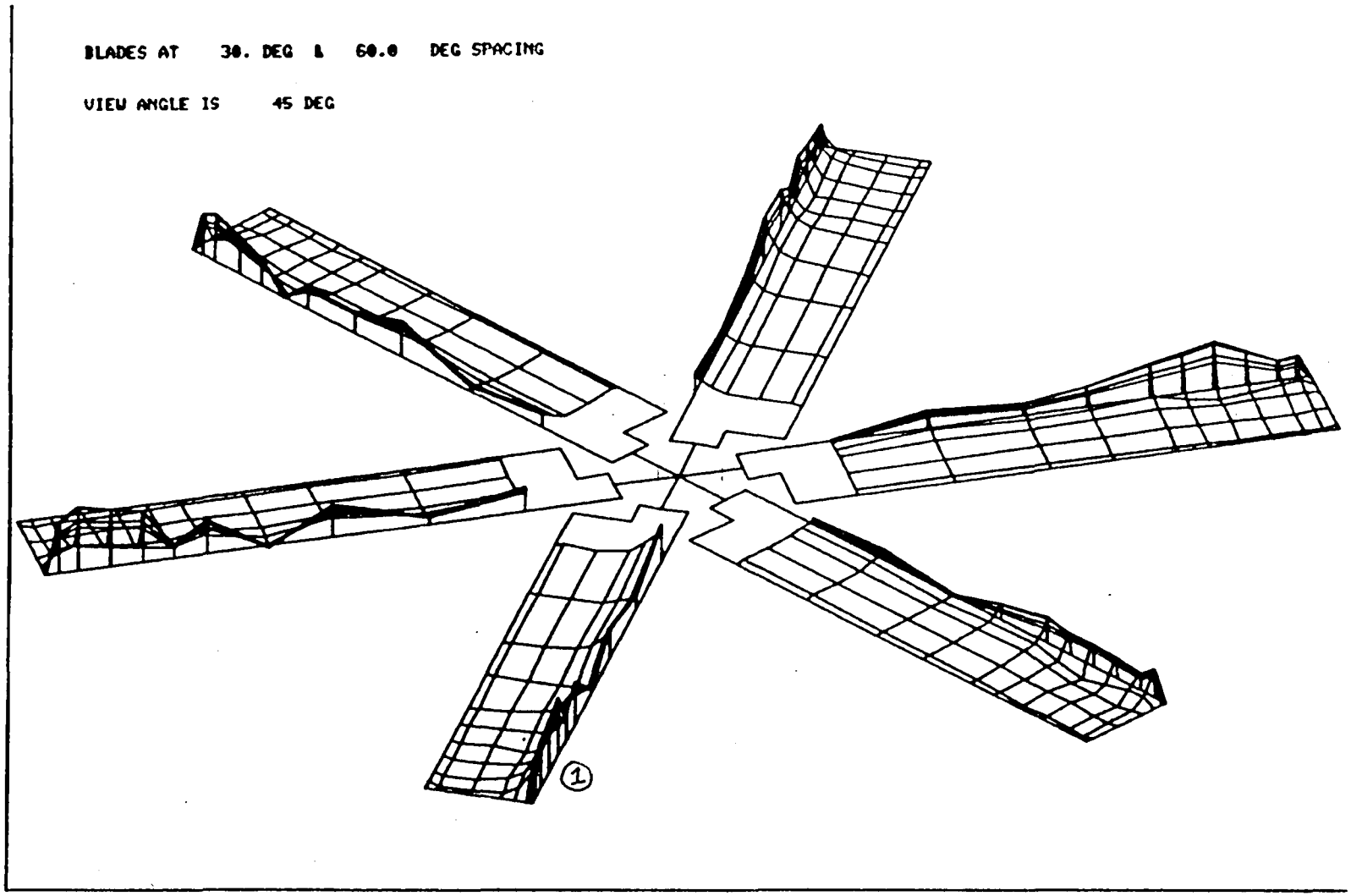


Figure 7. - Isometric plot - spanwise and chordwise loading on all six blades. Blade 1 positioned at 30^{0} azimuth position. V = 48.9 m/sec (95 kt). Measured input airload data.

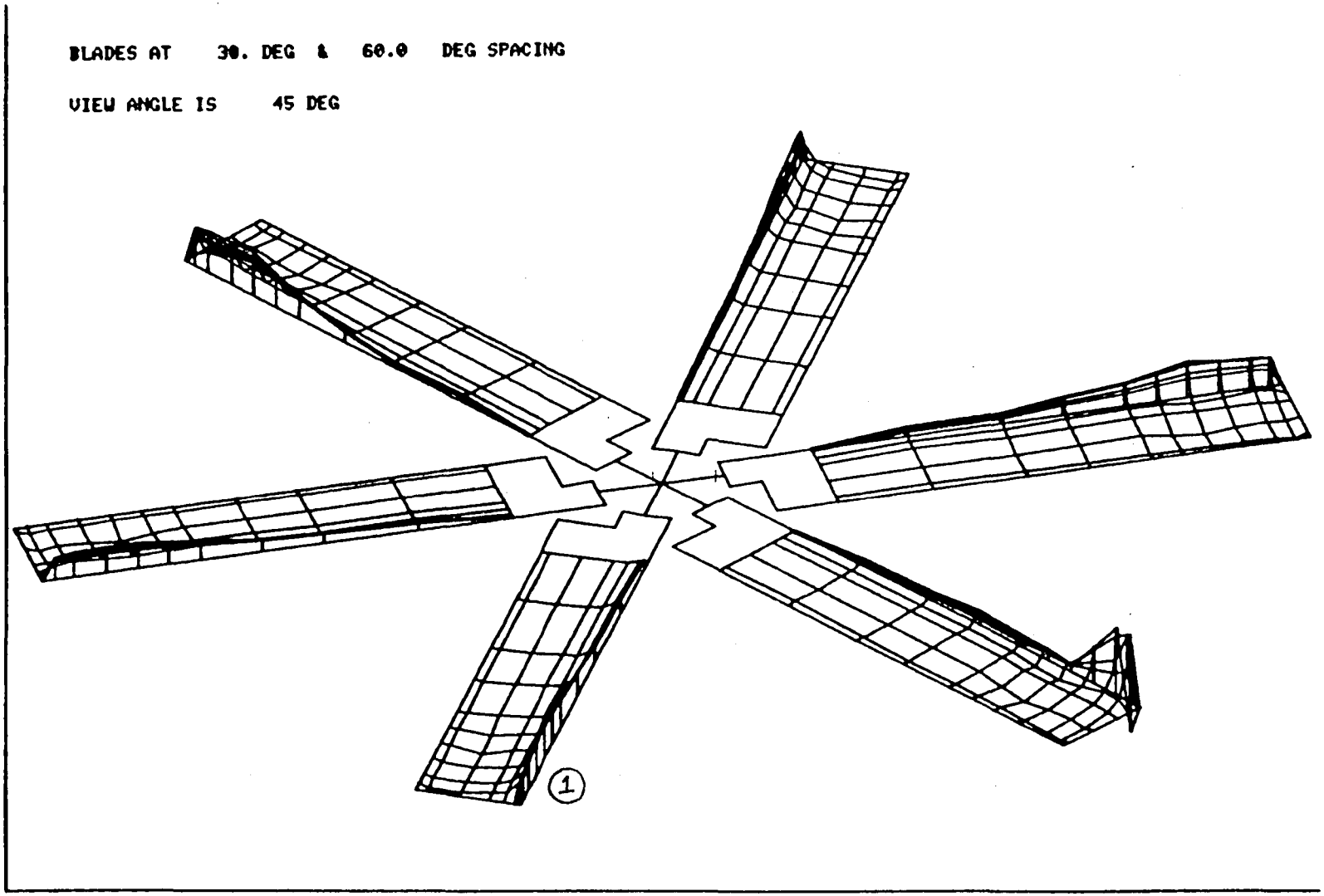


Figure 8. - Isometric plot - spanwise and chordwise loading on all six blades. Blade 1 positioned at 30^0 azimuth position. V = 82.3 m/sec (160 kt). Measured input airload data.

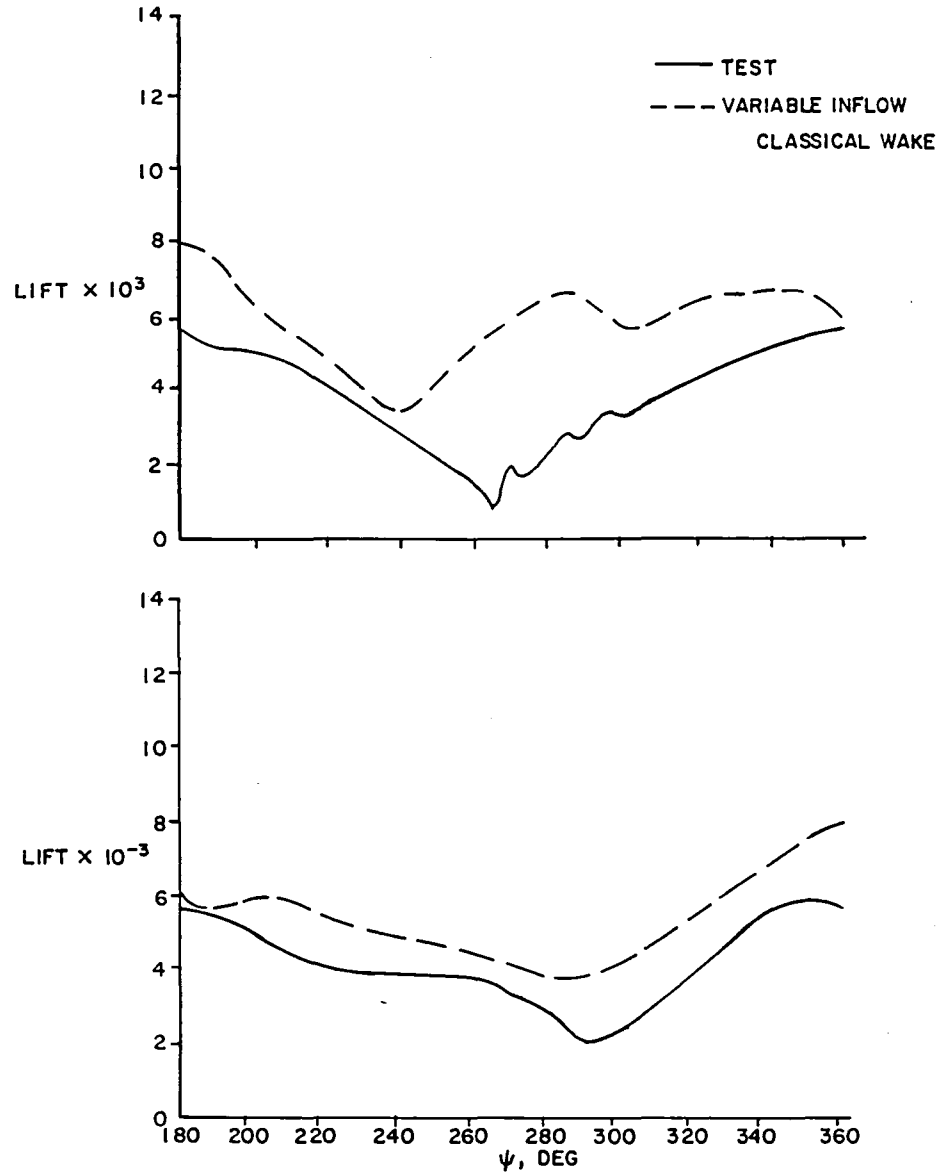
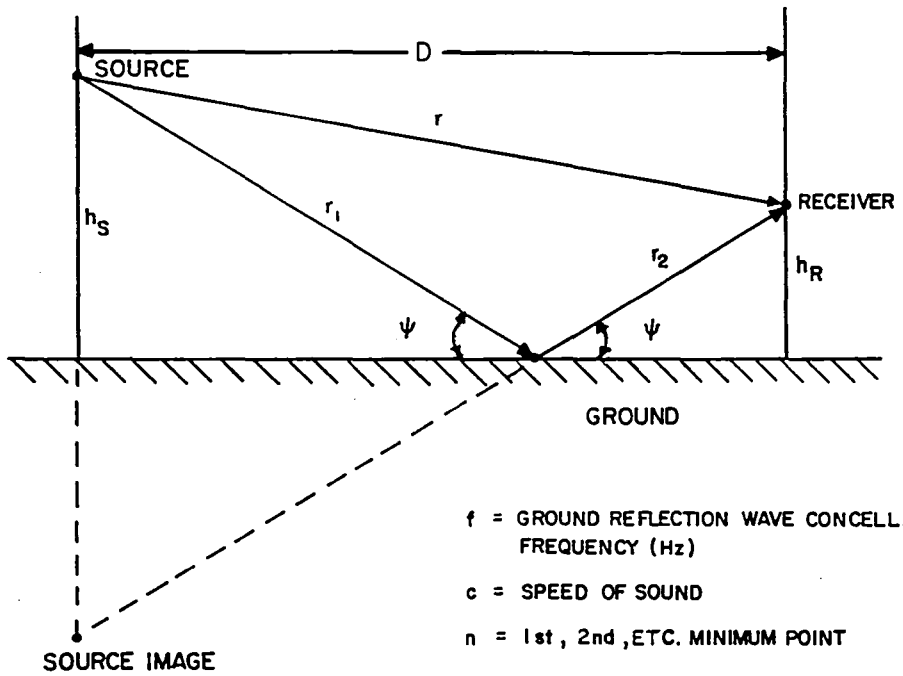


Figure 9. - Spanwise integrated blade lift: test vs. theory for the CH-53A rotor at 95 knots.



$$r = \sqrt{(h_S - h_R)^2 + D^2}$$

$$\psi = \tan^{-1}\left(\frac{h_S + h_R}{D}\right)$$

$$r_1 = h_S\sqrt{\left(1 + \frac{1}{\tan^2\psi}\right)}$$

$$r_2 = h_R\sqrt{\left(1 + \frac{1}{\tan^2\psi}\right)}$$

$$\Delta r = r - (r_1 + r_2)$$

$$f = \frac{nc}{2\Delta r}$$

Figure 10. - Ground reflection wave geometry.

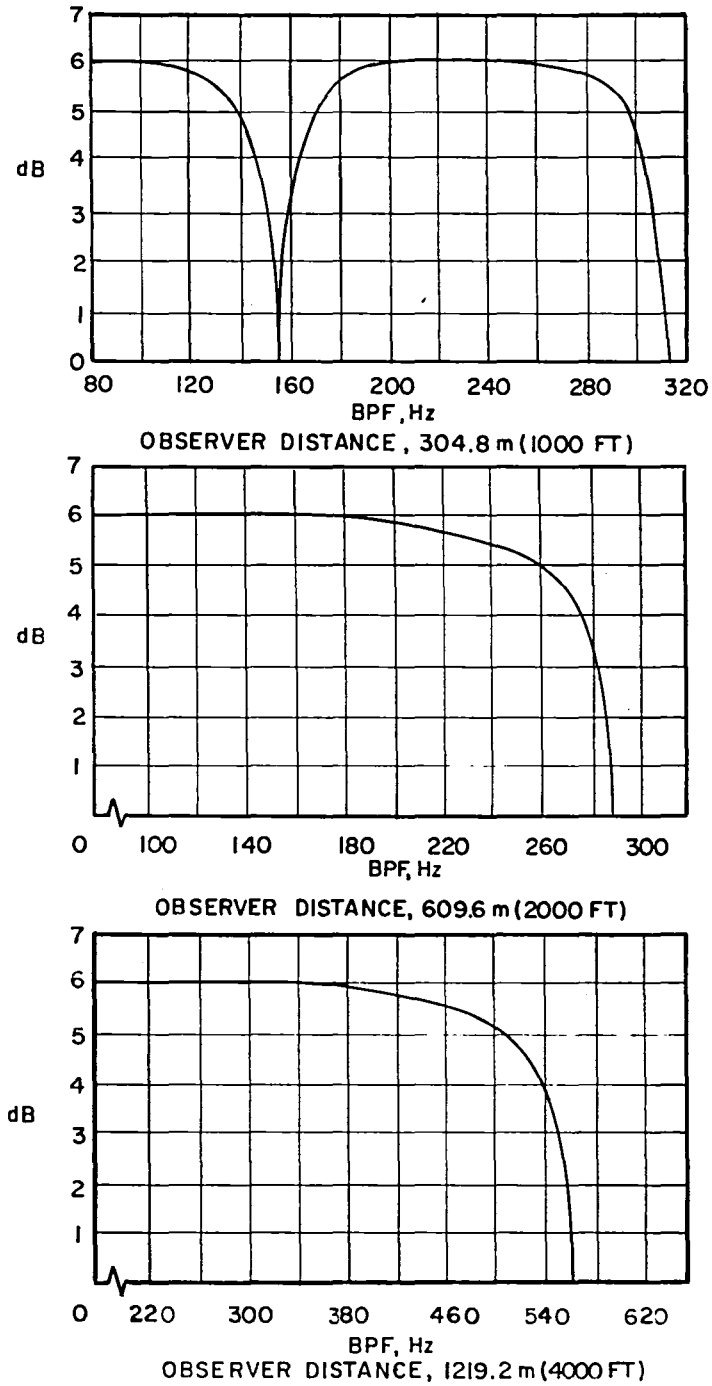
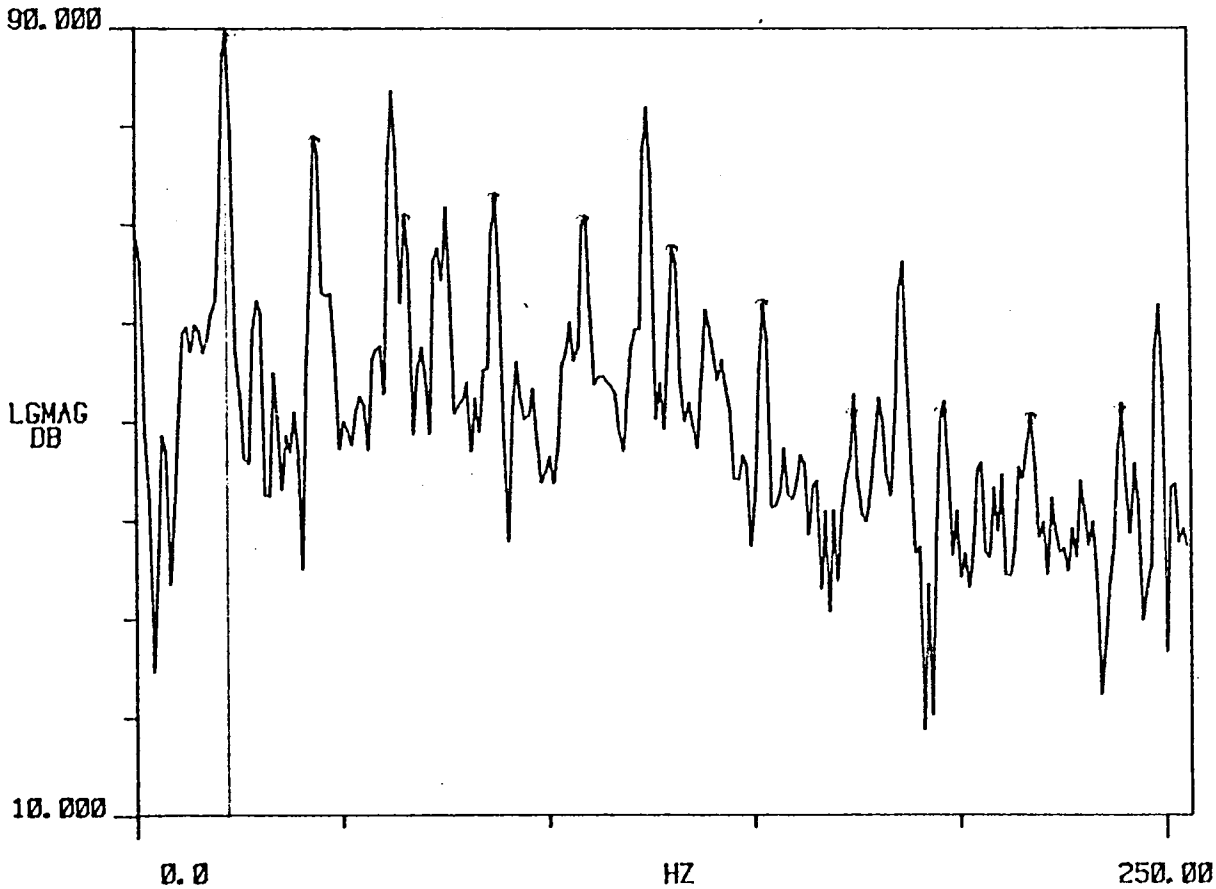
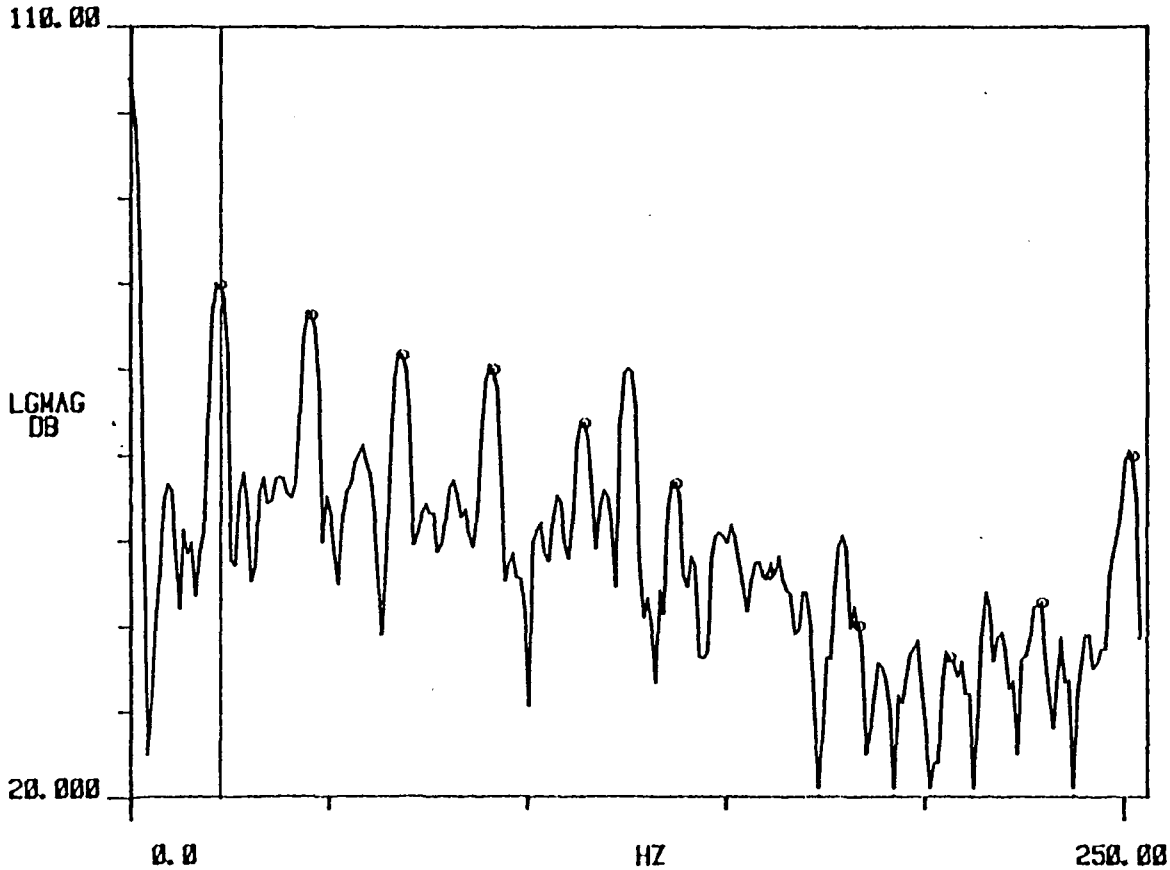


Figure 11. - Ground reflection effects correction curves.



HARMONIC FREQUENCY (HZ)	HARMONIC AMPLITUDE (DB)	HARMONIC PHASE ANGLE (DEG)
22.0000 E+0	89.6243 E+0	1.62323 E+0
43.0000 E+0	79.0216 E+0	-57.3294 E+0
65.0000 E+0	70.9003 E+0	-5.12512 E+0
87.0000 E+0	73.1351 E+0	62.4751 E+0
109.000 E+0	70.5487 E+0	-136.133 E+0
130.000 E+0	67.5952 E+0	176.417 E+0
152.000 E+0	61.9028 E+0	-21.6046 E+0
174.000 E+0	52.7478 E+0	162.990 E+0
195.000 E+0	50.0983 E+0	-169.014 E+0
217.000 E+0	50.6747 E+0	19.6394 E+0
239.000 E+0	51.8976 E+0	-152.475 E+0

Figure 12. - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.



HARMONIC FREQUENCY (HZ)	HARMONIC AMPLITUDE (DB)	HARMONIC PHASE ANGLE (DEG)
23.0000 E+0	79.7220 E+0	98.0585 E+0
46.0000 E+0	76.0880 E+0	-121.709 E+0
69.0000 E+0	71.3721 E+0	35.0491 E+0
92.0000 E+0	69.6548 E+0	-149.675 E+0
115.000 E+0	63.4930 E+0	55.4631 E+0
138.000 E+0	58.5198 E+0	-123.294 E+0
161.000 E+0	45.9335 E+0	46.6425 E+0
184.000 E+0	39.9054 E+0	-165.964 E+0
207.000 E+0	36.1865 E+0	-172.875 E+0
230.000 E+0	42.6694 E+0	61.9464 E+0
253.000 E+0	59.7910 E+0	-71.8739 E+0

Figure 13. - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

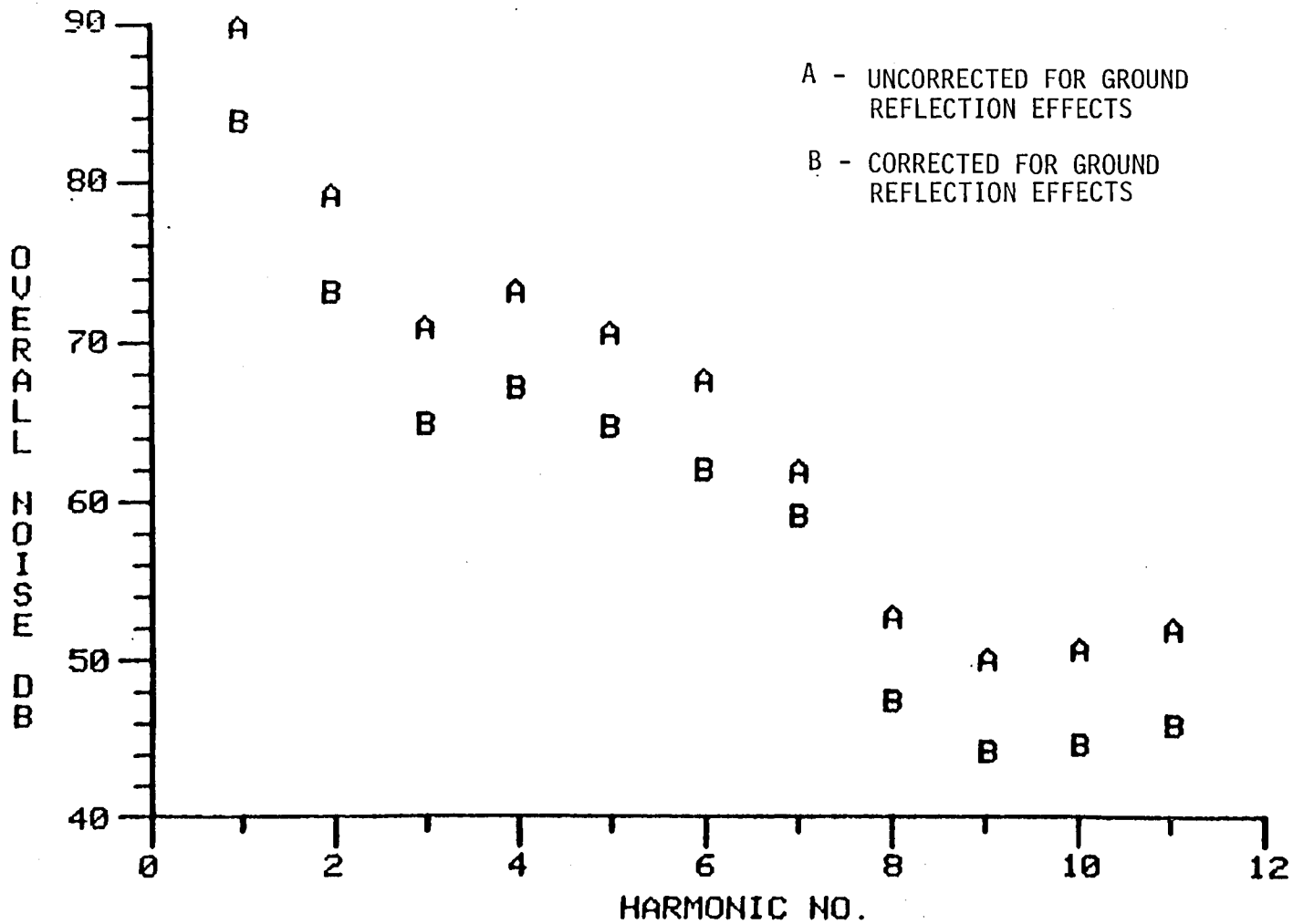


Figure 14. - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 304.8m (100 ft) ahead of helicopter.

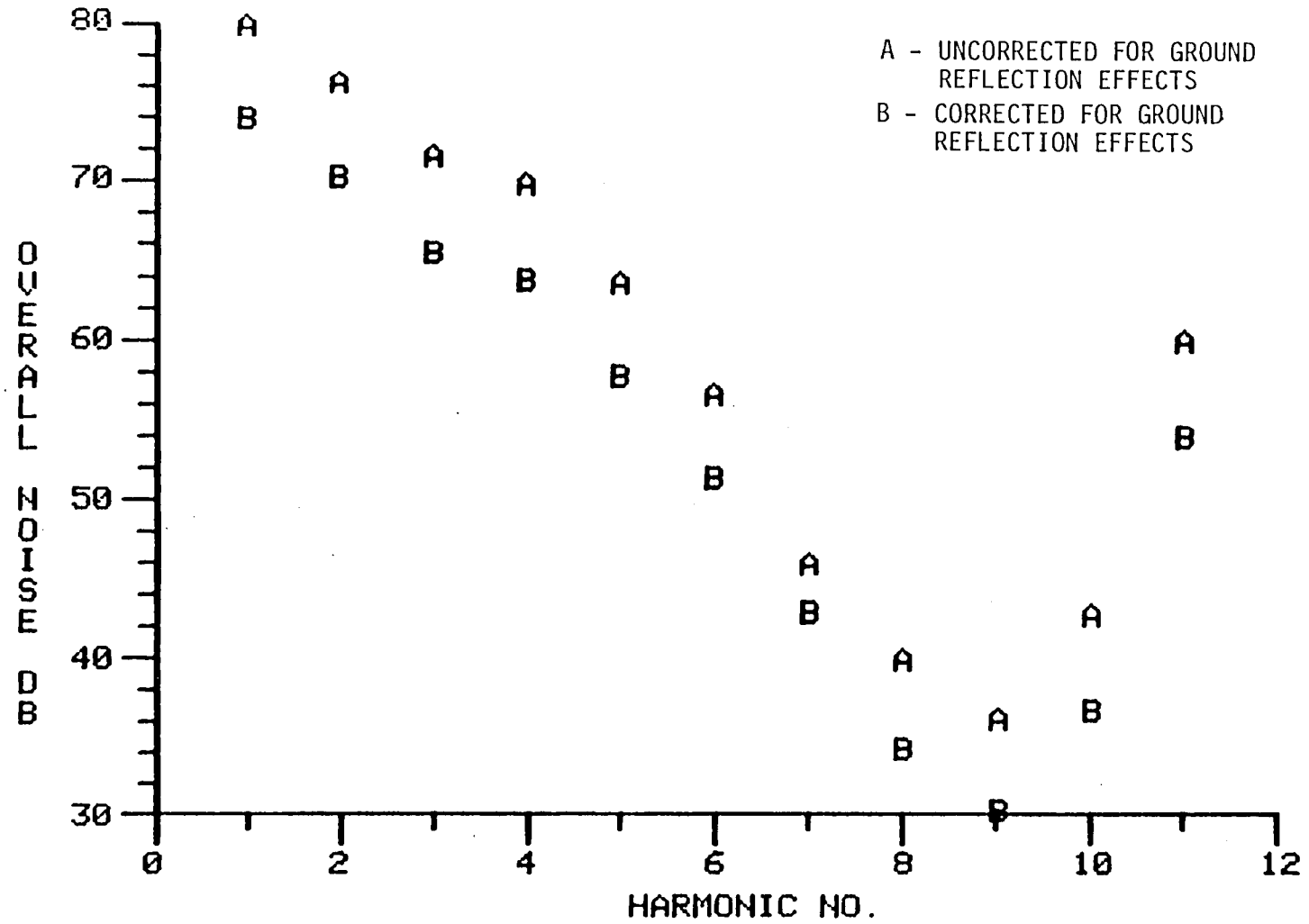


Figure 15. - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

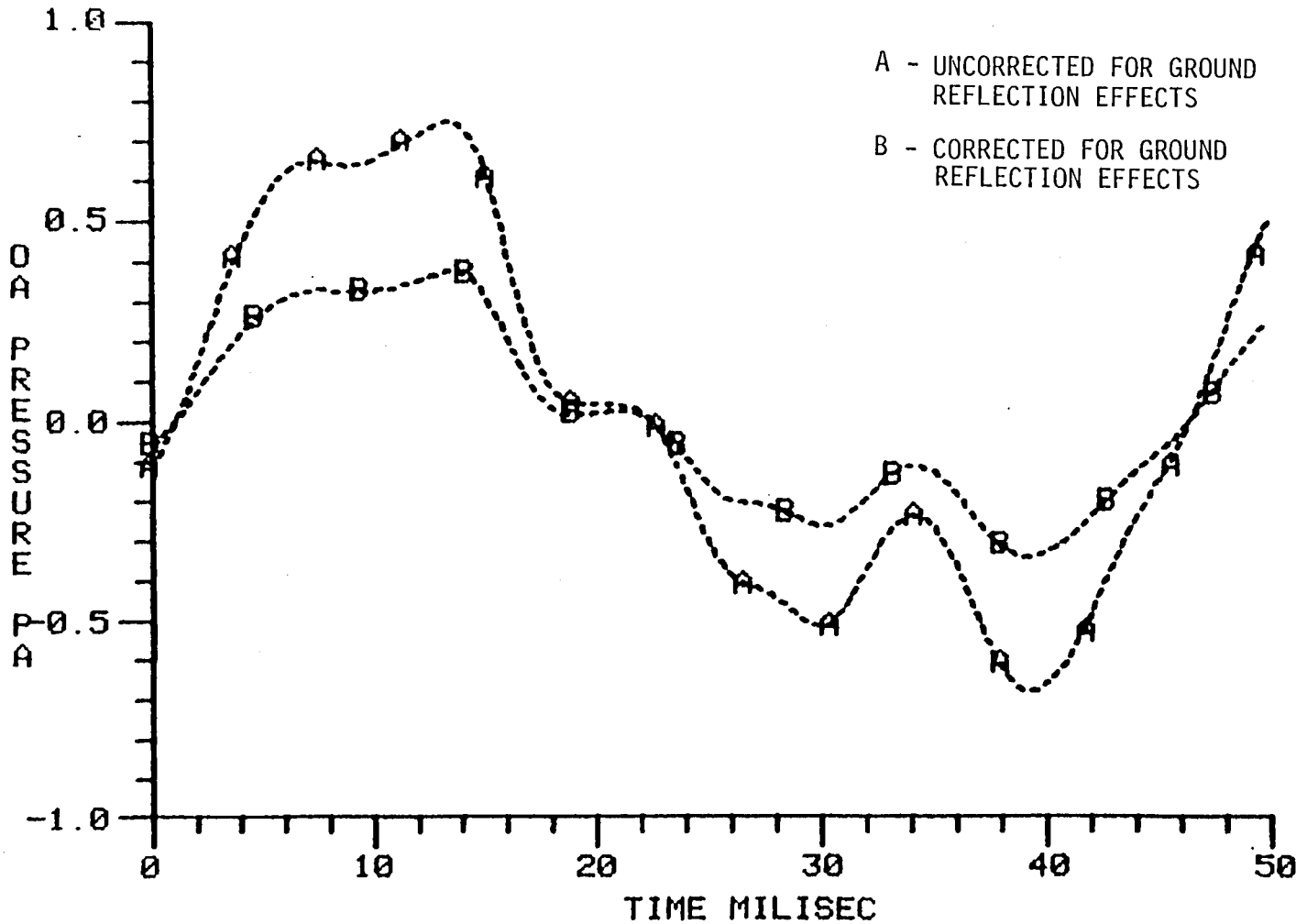


Figure 16. - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

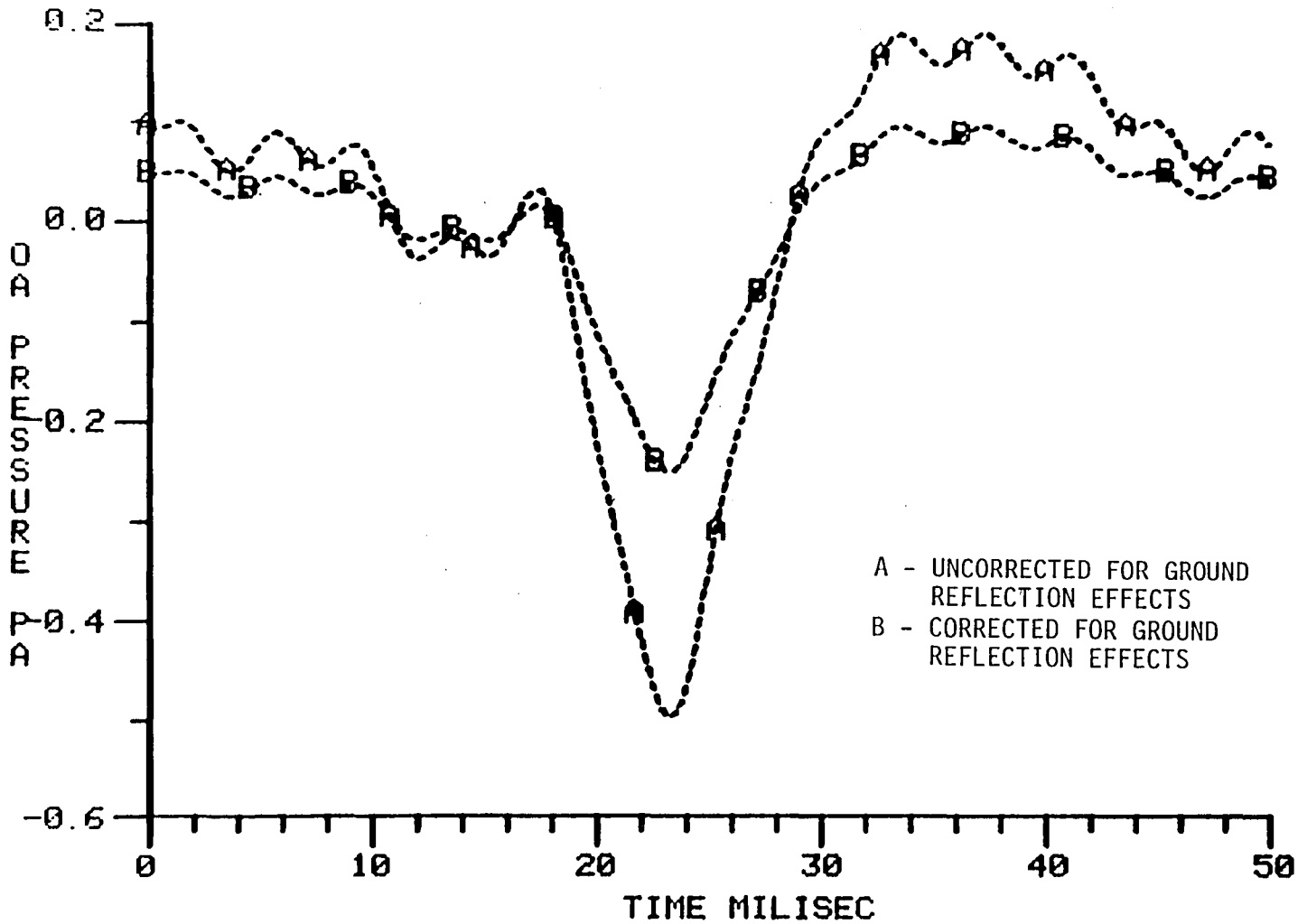


Figure 17. - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

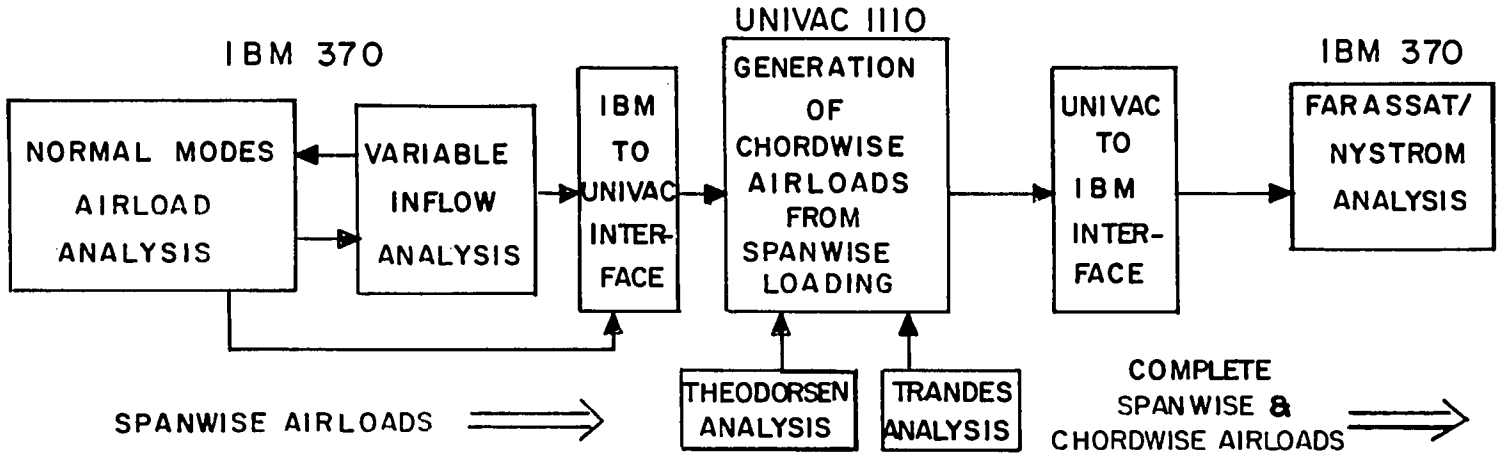
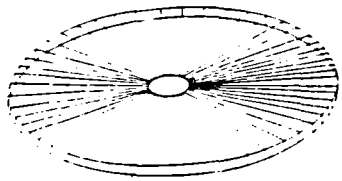
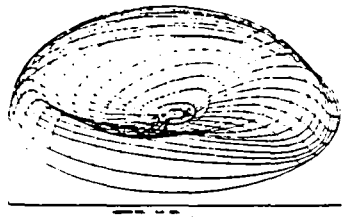
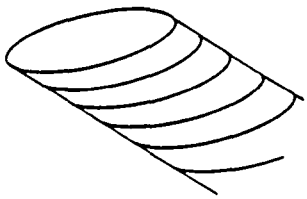
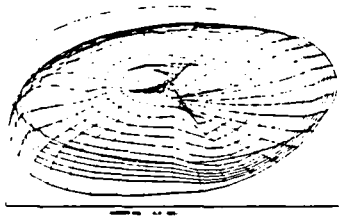
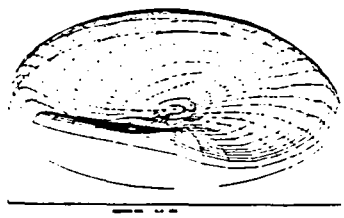


Figure 18. - Process for creation of predicted airload data set input.

CONSTANT INFLOW

WAKE MODEL	INFLOW DISTRIBUTION	AIRLOADS
NO WAKE		

VARIABLE INFLOW(CLASSICAL)

VARIABLE INFLOW (DISTORTED WAKE)

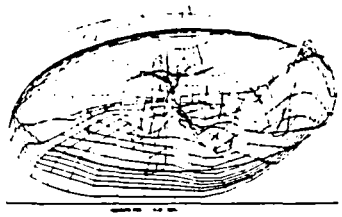
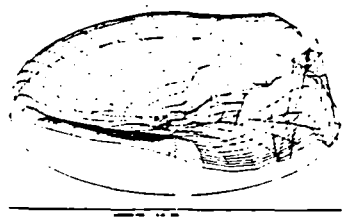




Figure 19. - Wake model effects on predicted airloads.

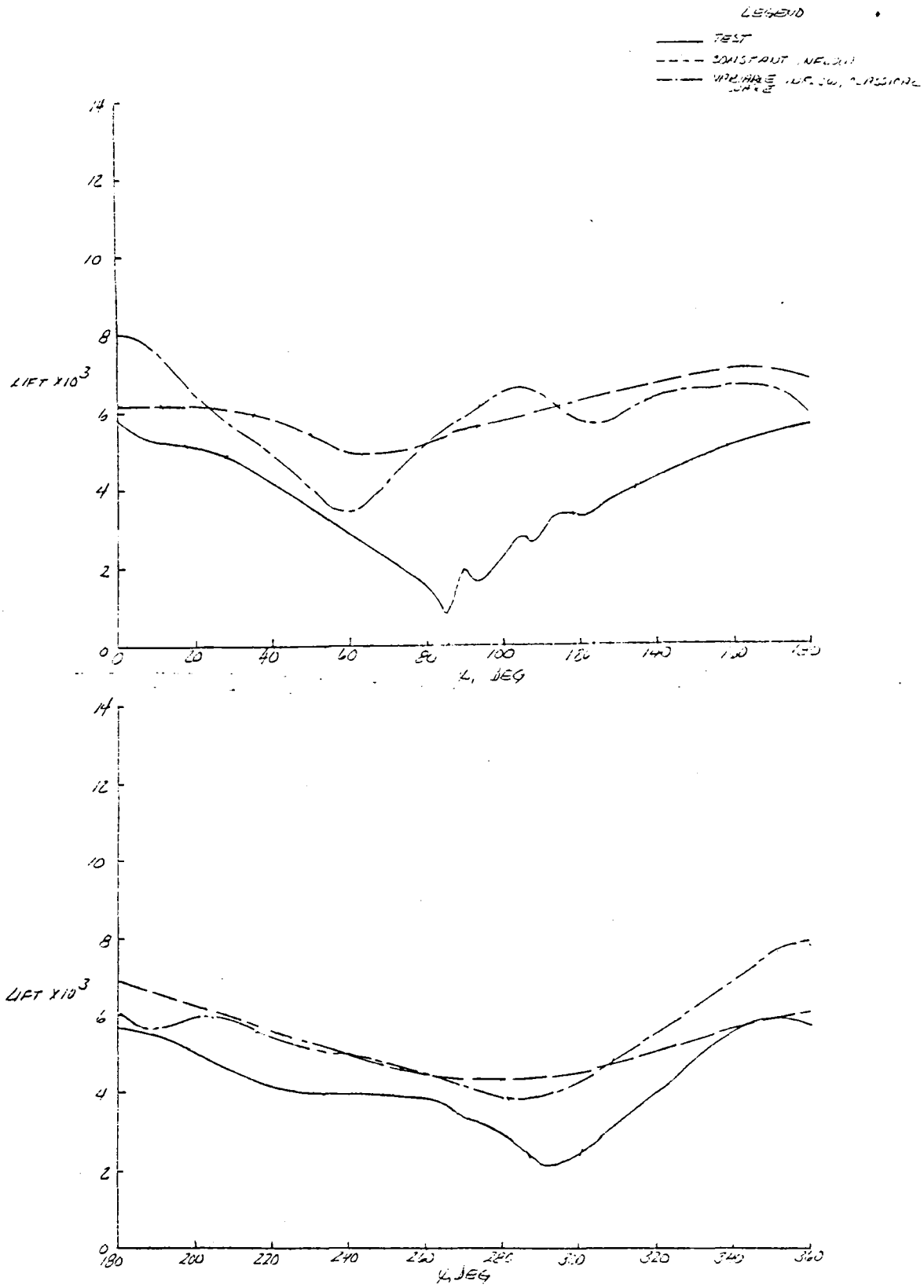


Figure 20. - Spanwise integrated blade lift: test vs. theory for the CH-53A rotor at 95 knots.

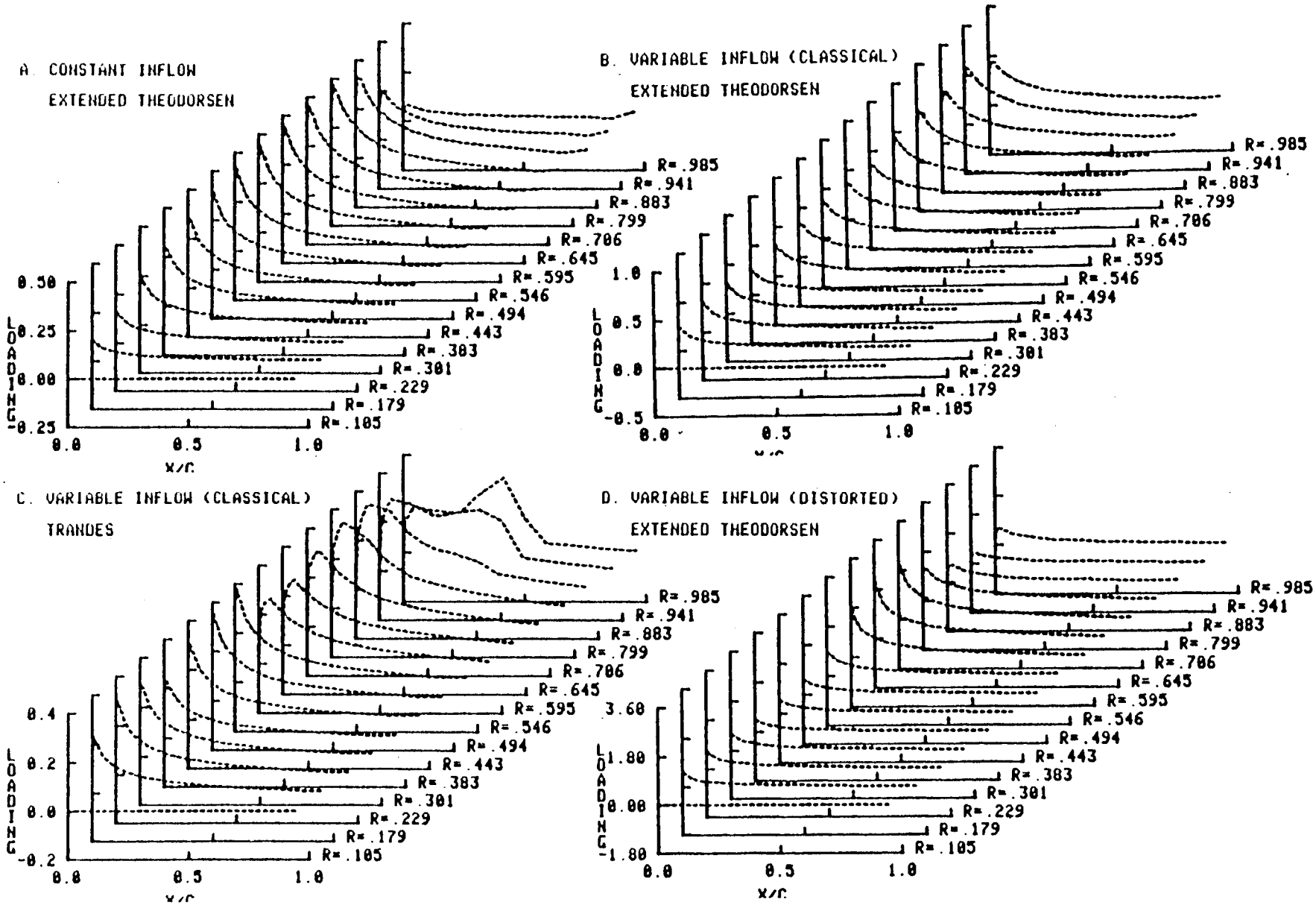


Figure 21. - Comparison of pressure loading distributions based on various methodologies at a blade azimuth of 105 degrees for the CH-53A rotor at 95 knots using flexible blade aeroelastics.

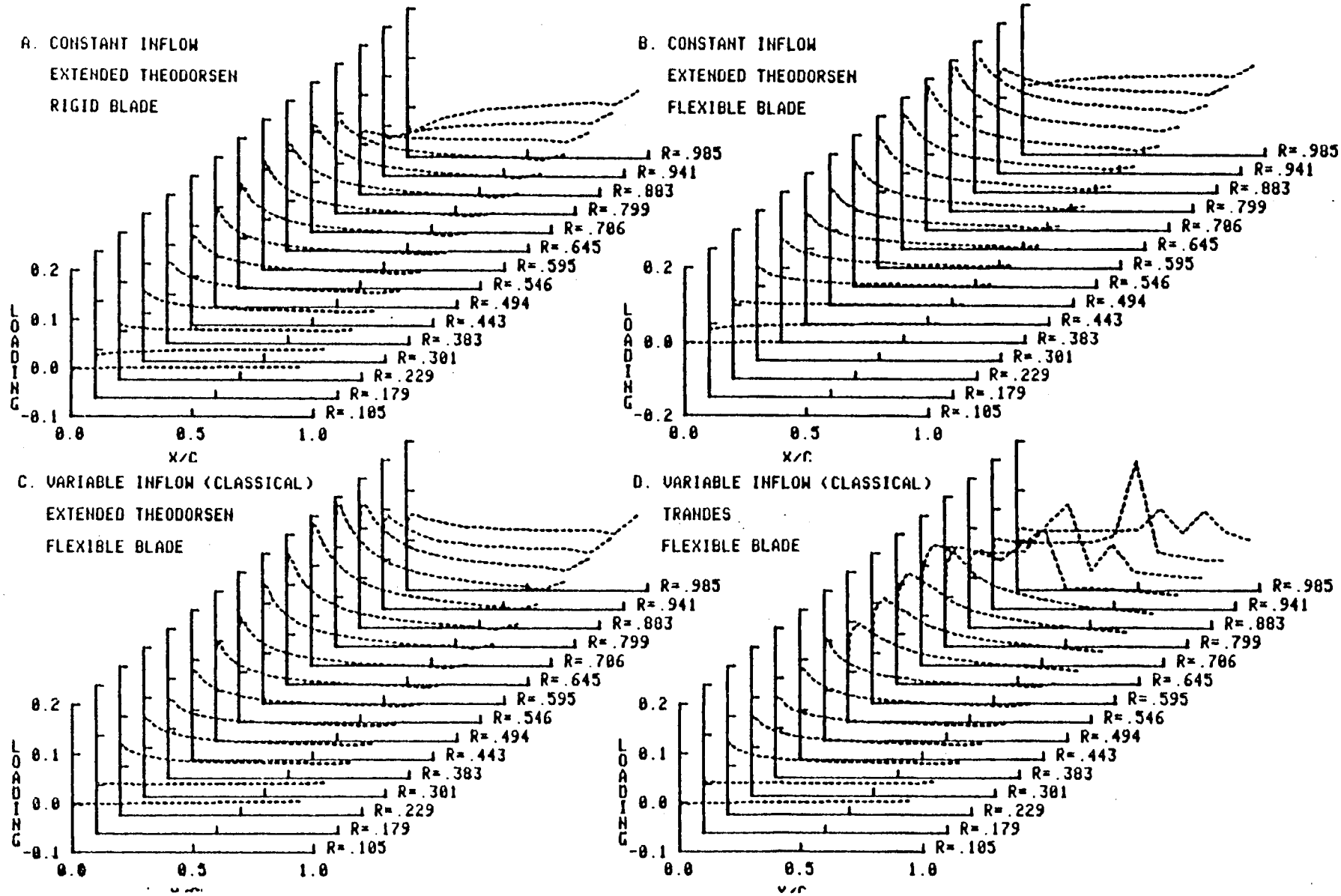


Figure 22. - Comparison of pressure loading distributions based on various methodologies at a blade azimuth of 90 degrees for the CH-53 rotor at 160 knots.

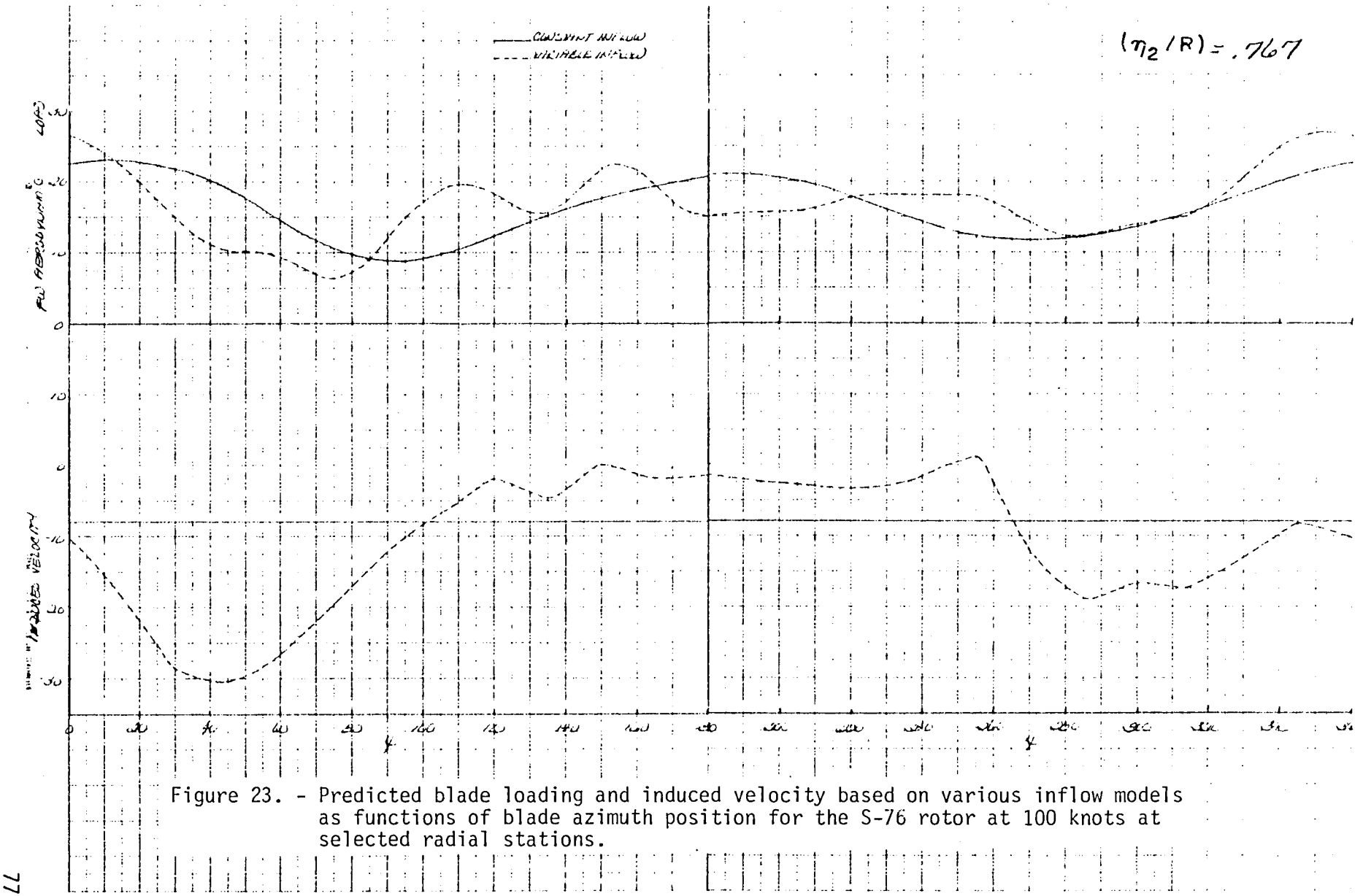


Figure 23. - Predicted blade loading and induced velocity based on various inflow models as functions of blade azimuth position for the S-76 rotor at 100 knots at selected radial stations.

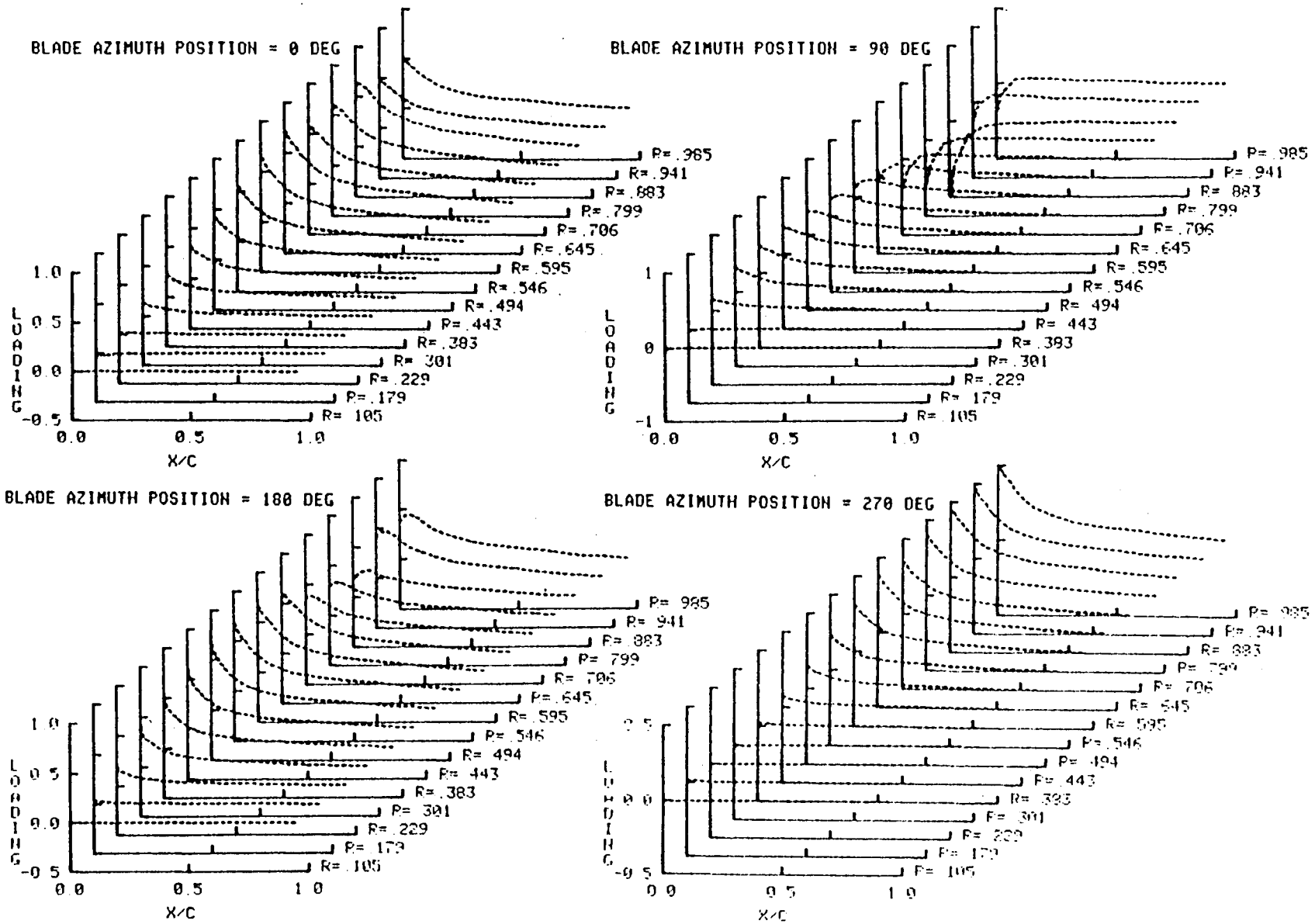


Figure 24. - Chordwise pressure loading predictions at selected blade azimuth positions for the S-76 rotor at 100 knots using the flexible blade-constant inflow-extended theodorsen models.

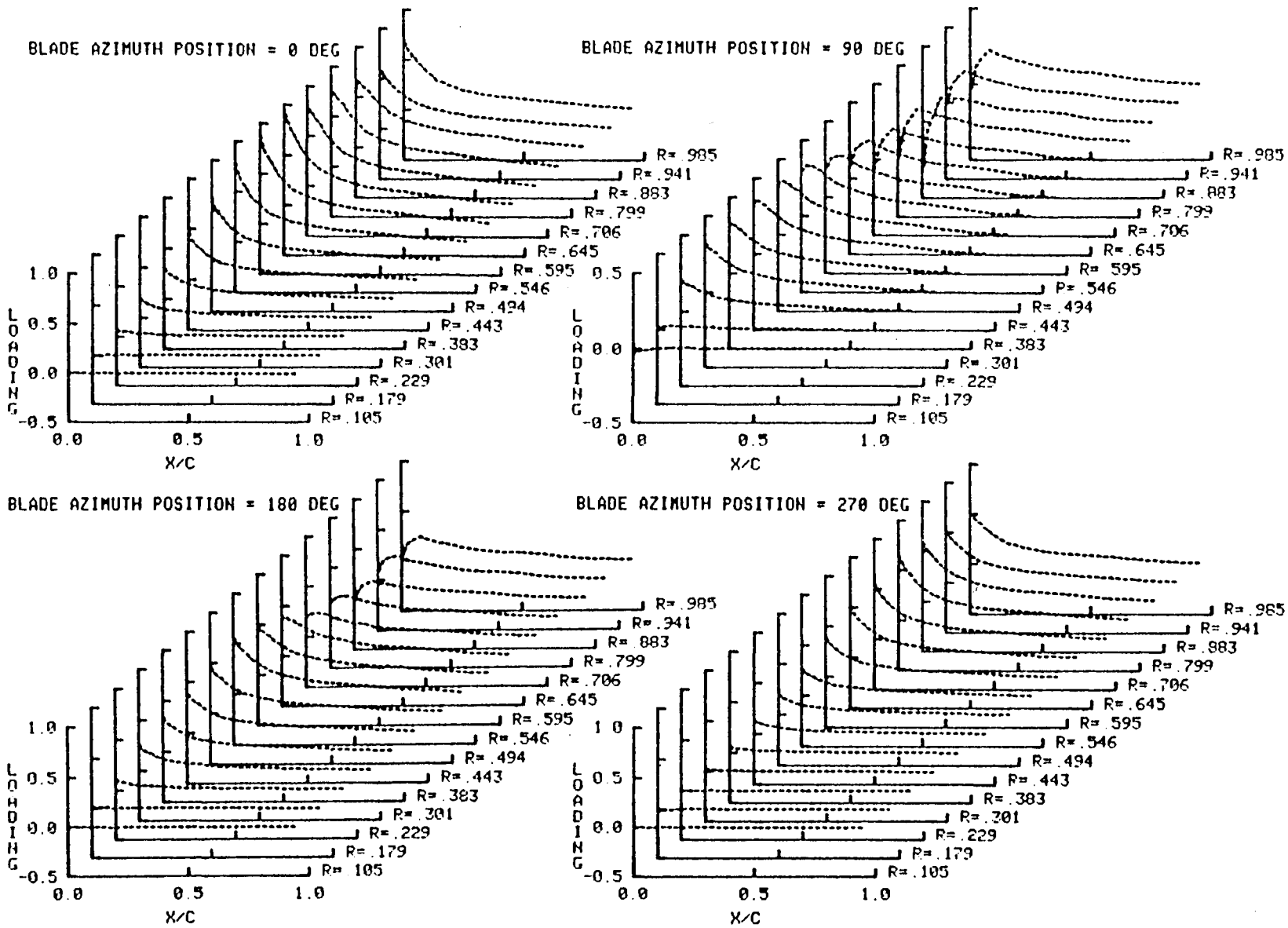


Figure 25. - Chordwise pressure loading predictions at selected blade azimuth positions for the S-76 rotor at 100 knots using the flexible blade-classical wake-variable inflow-extended theorsen models.

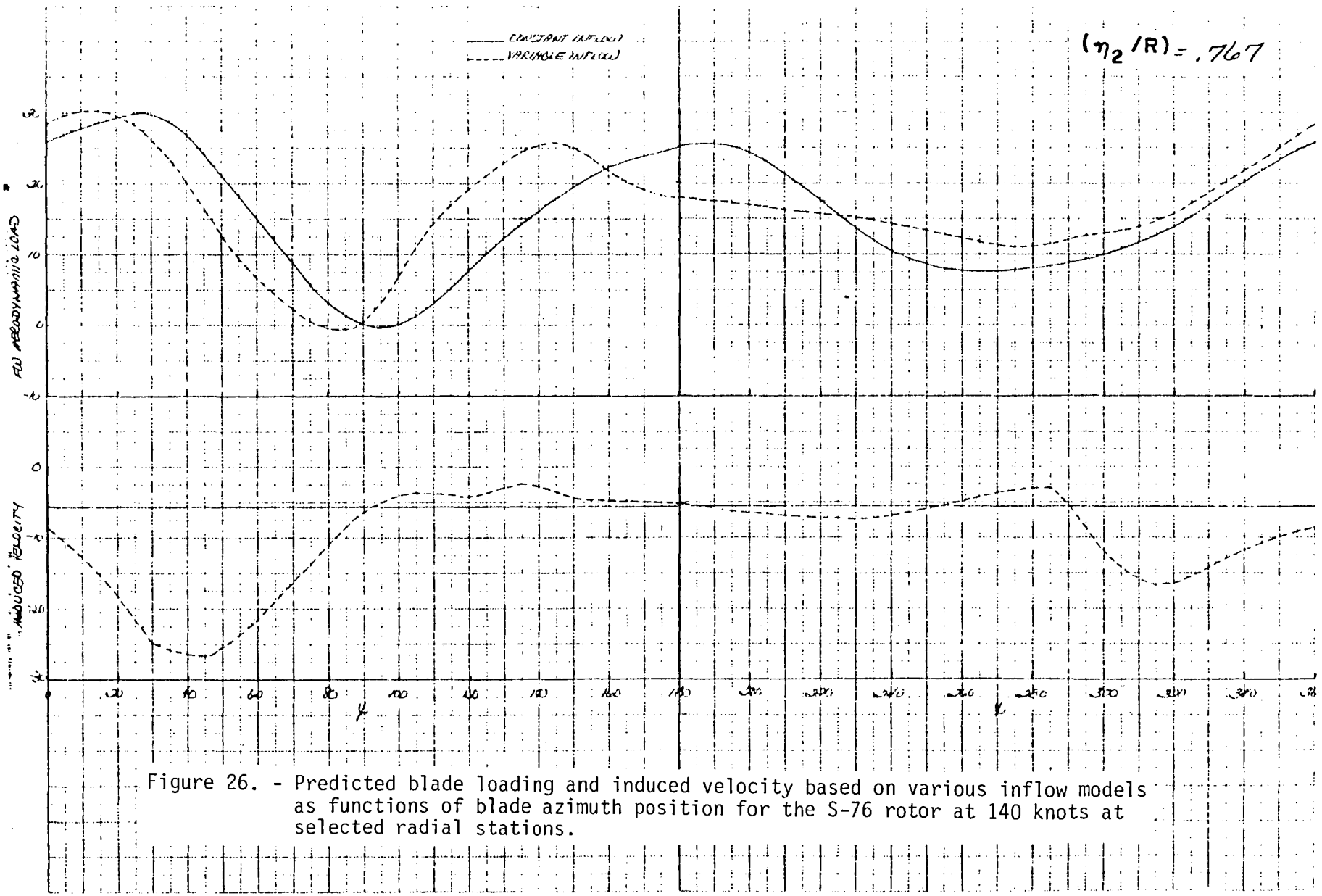


Figure 26. - Predicted blade loading and induced velocity based on various inflow models as functions of blade azimuth position for the S-76 rotor at 140 knots at selected radial stations.

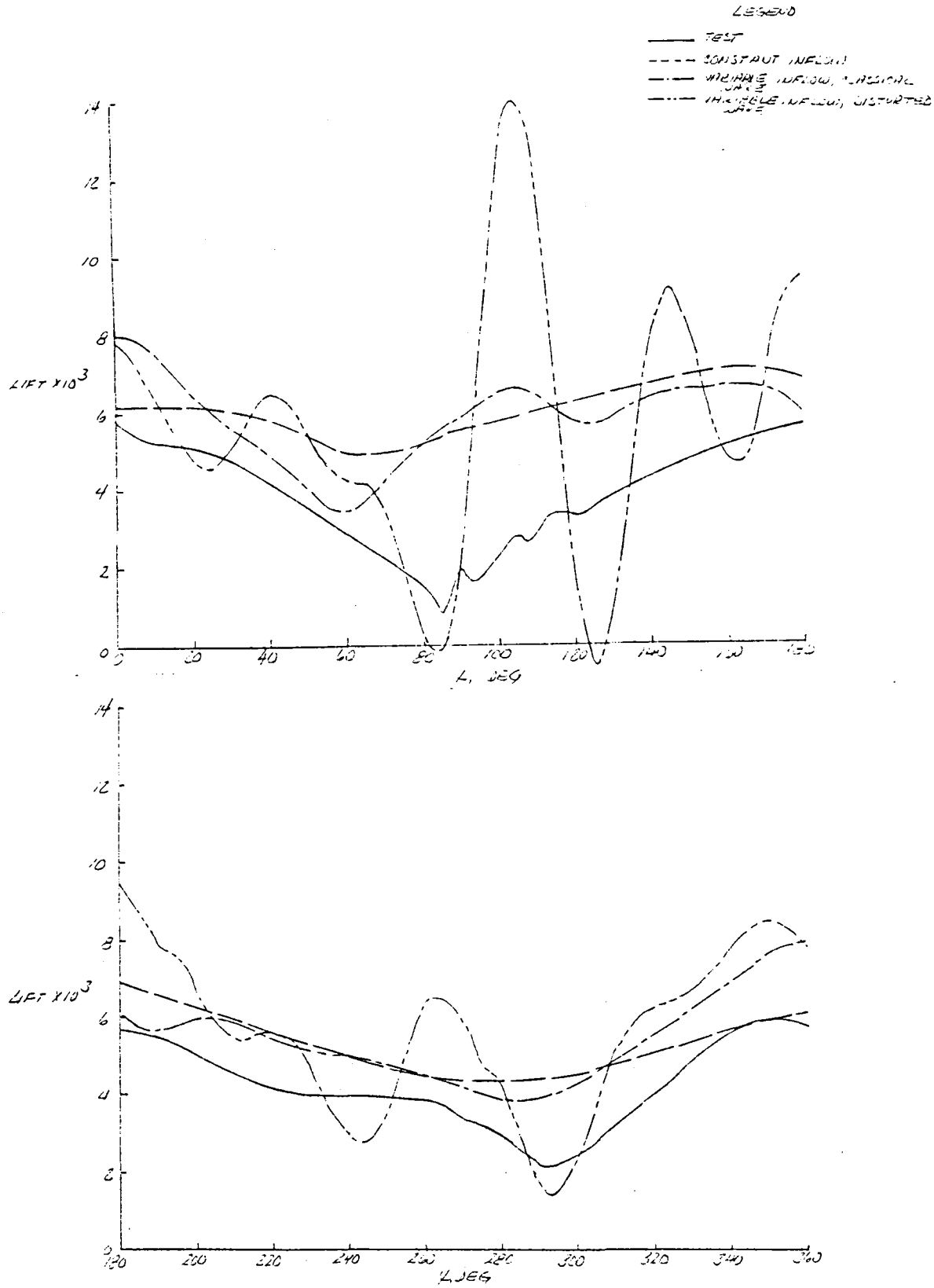


Figure 27. - Spanwise integrated blade lift: test vs. theory for the CH-53A rotor at 95 knots.

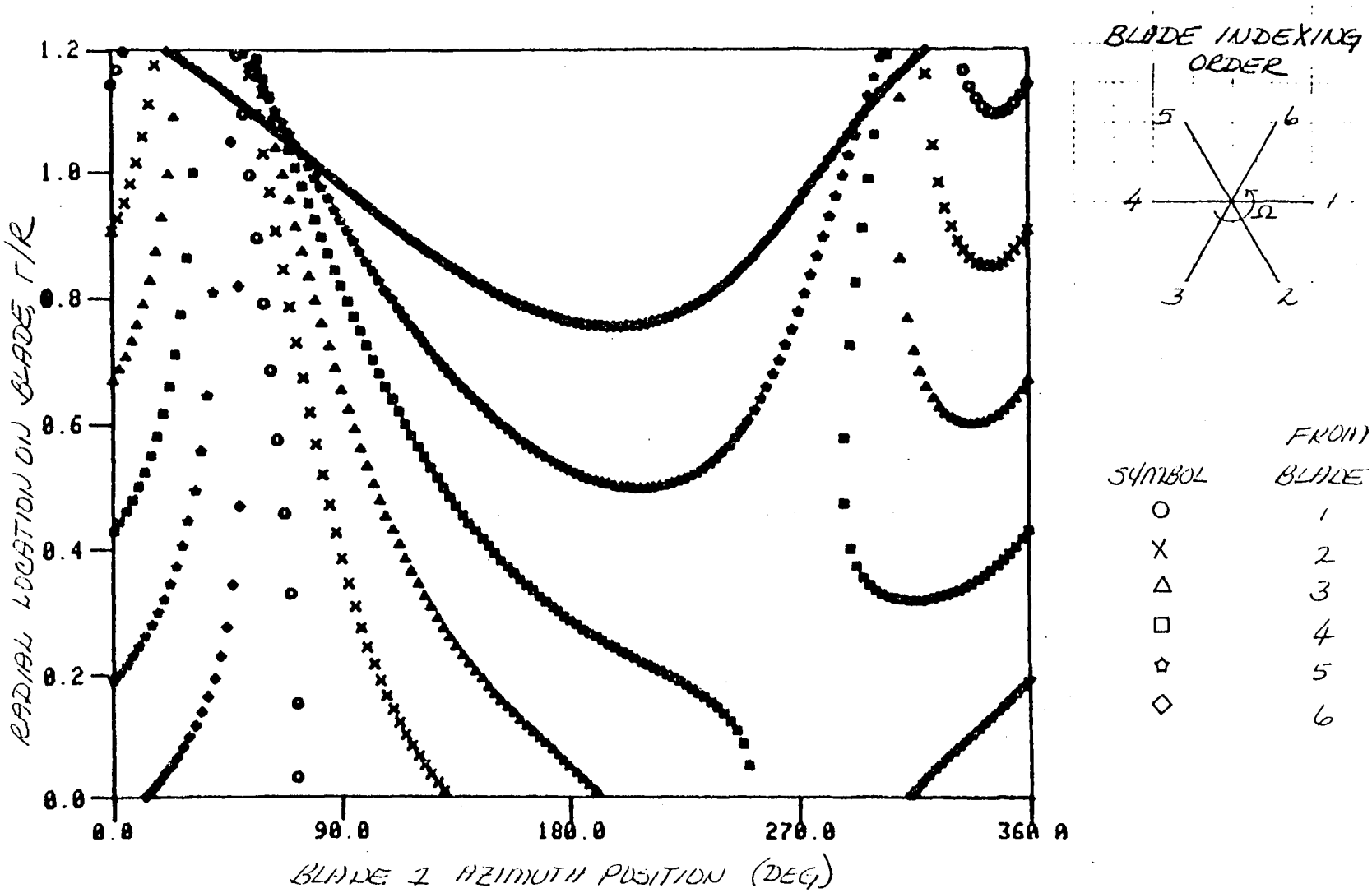


Figure 28. - Plot of potential blade - tip vortex intersections for the CH-53 rotor at 95 knots.

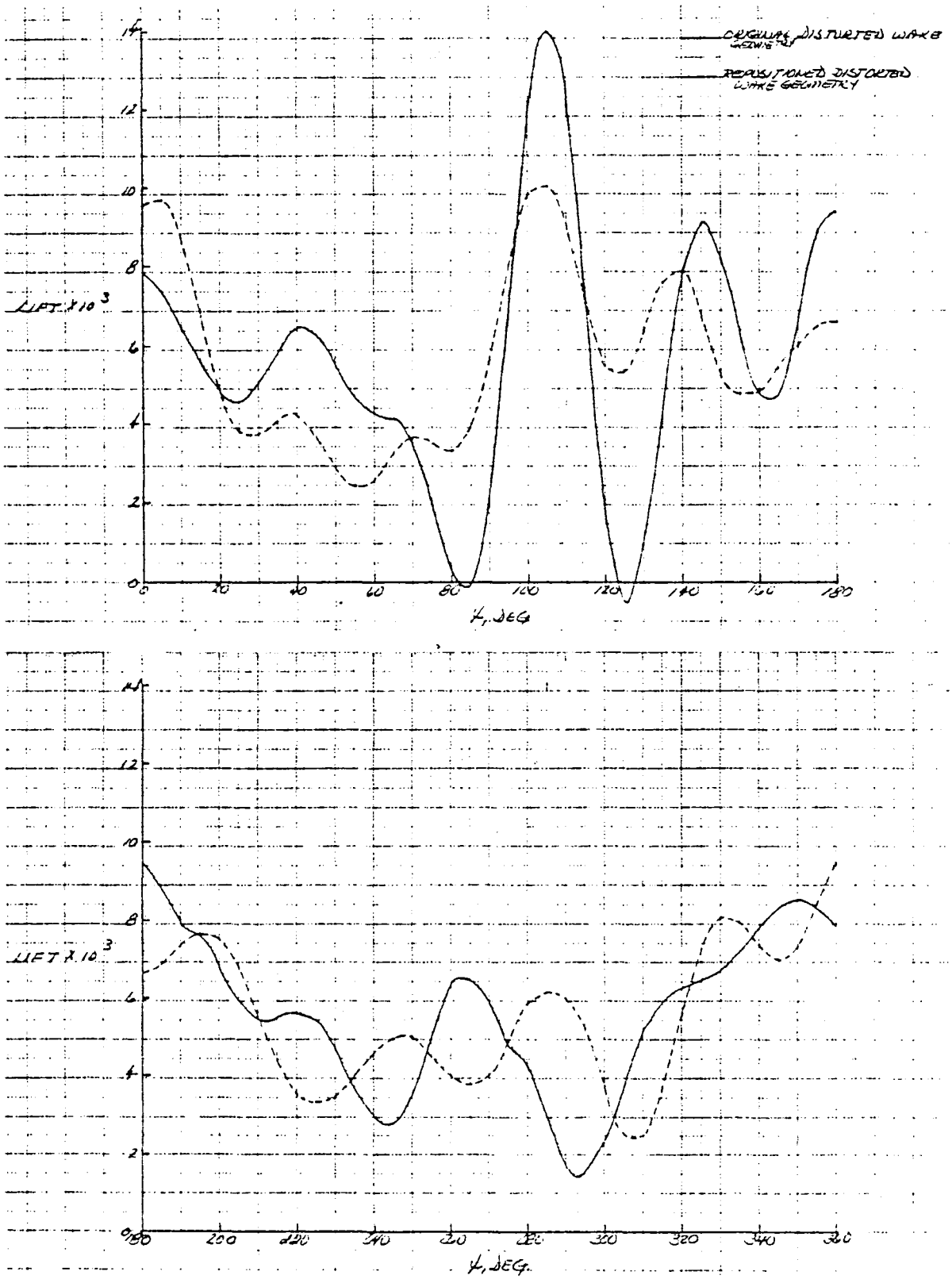


Figure 29. - Comparisons of predicted blade lift using various distorted wake geometries for the CH-53 rotor at 95 knots.

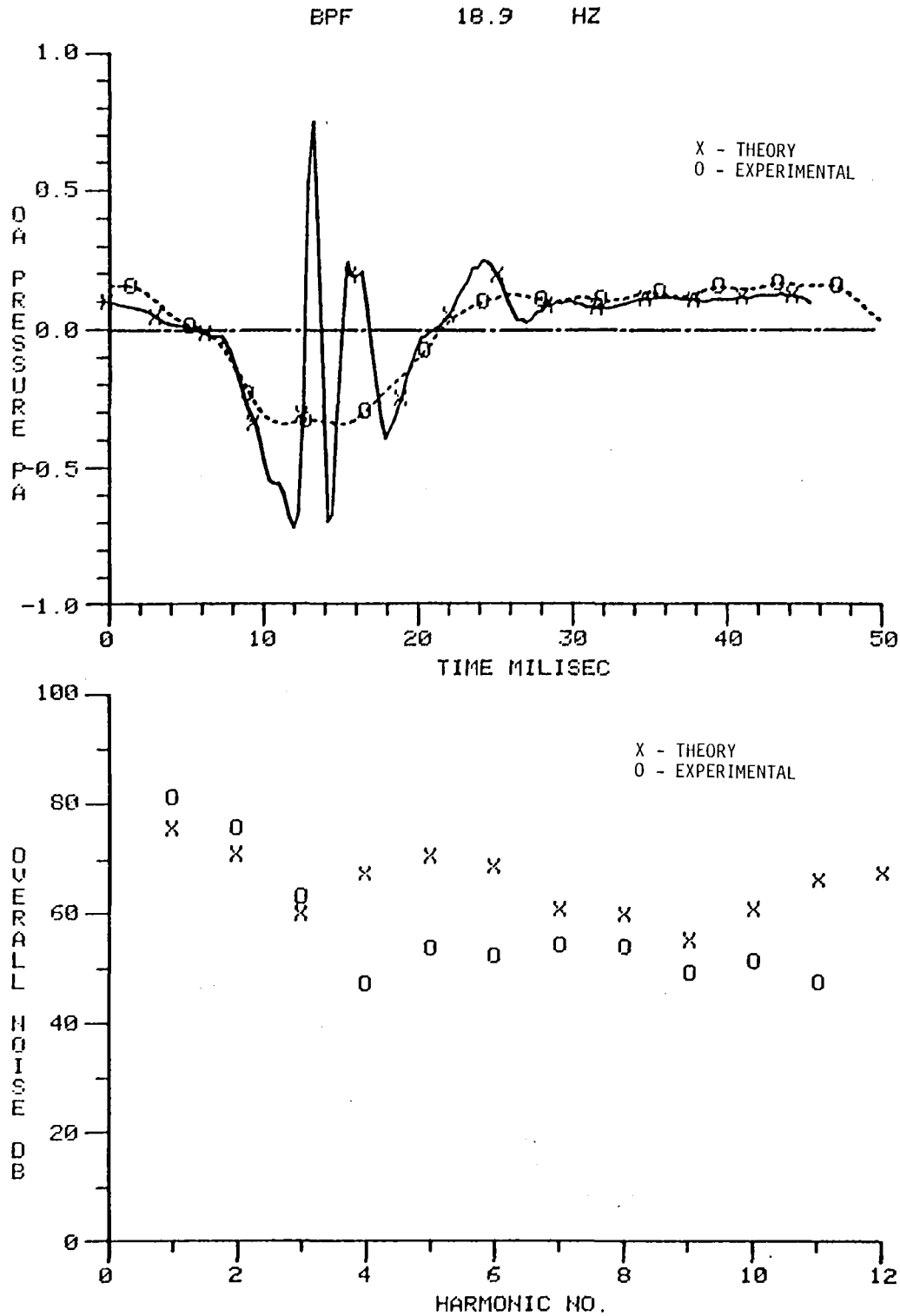


Figure 30.- Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using measured input airload.

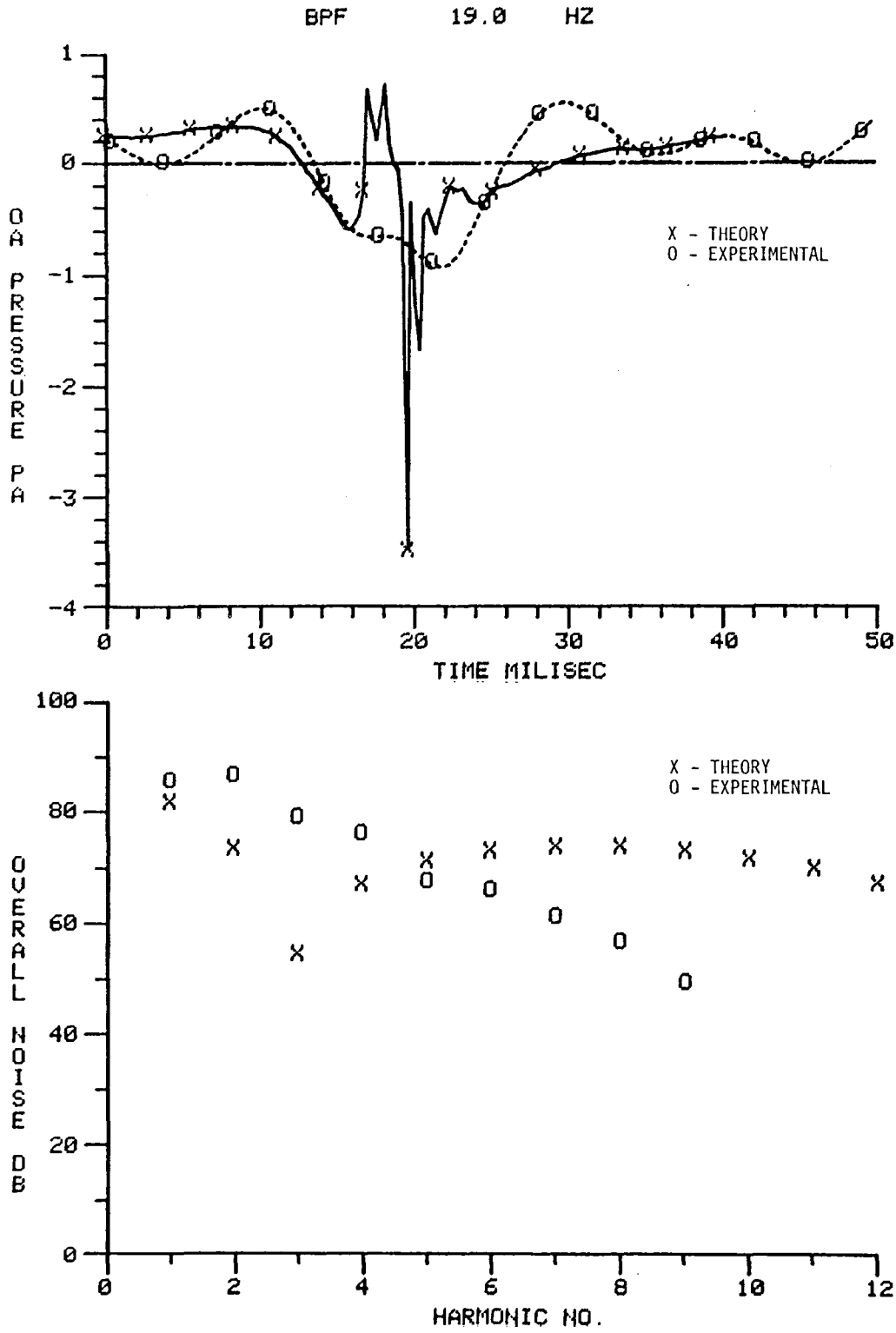


Figure 31. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using measured input airload.

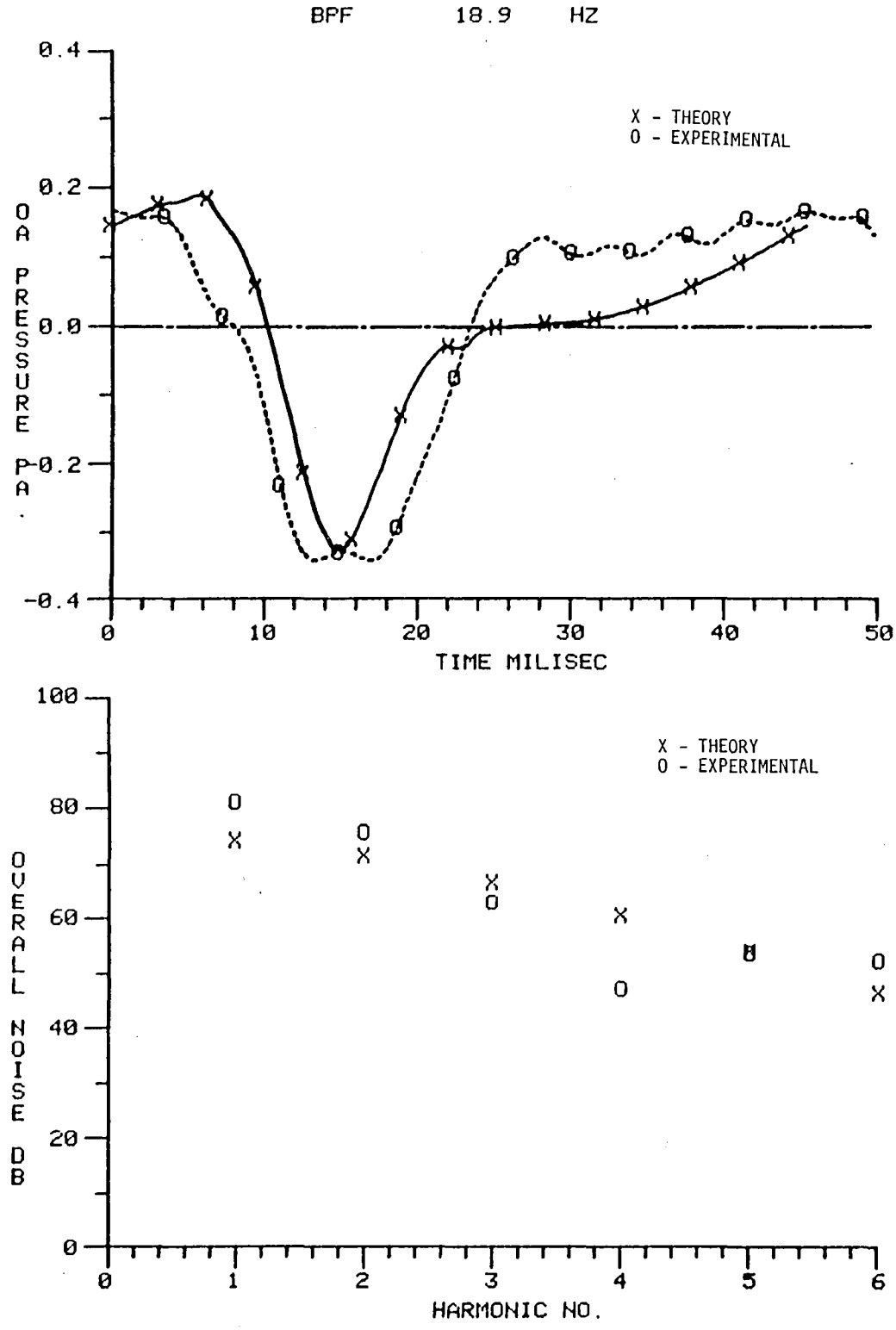


Figure 32. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (rigid blade, constant inflow model).

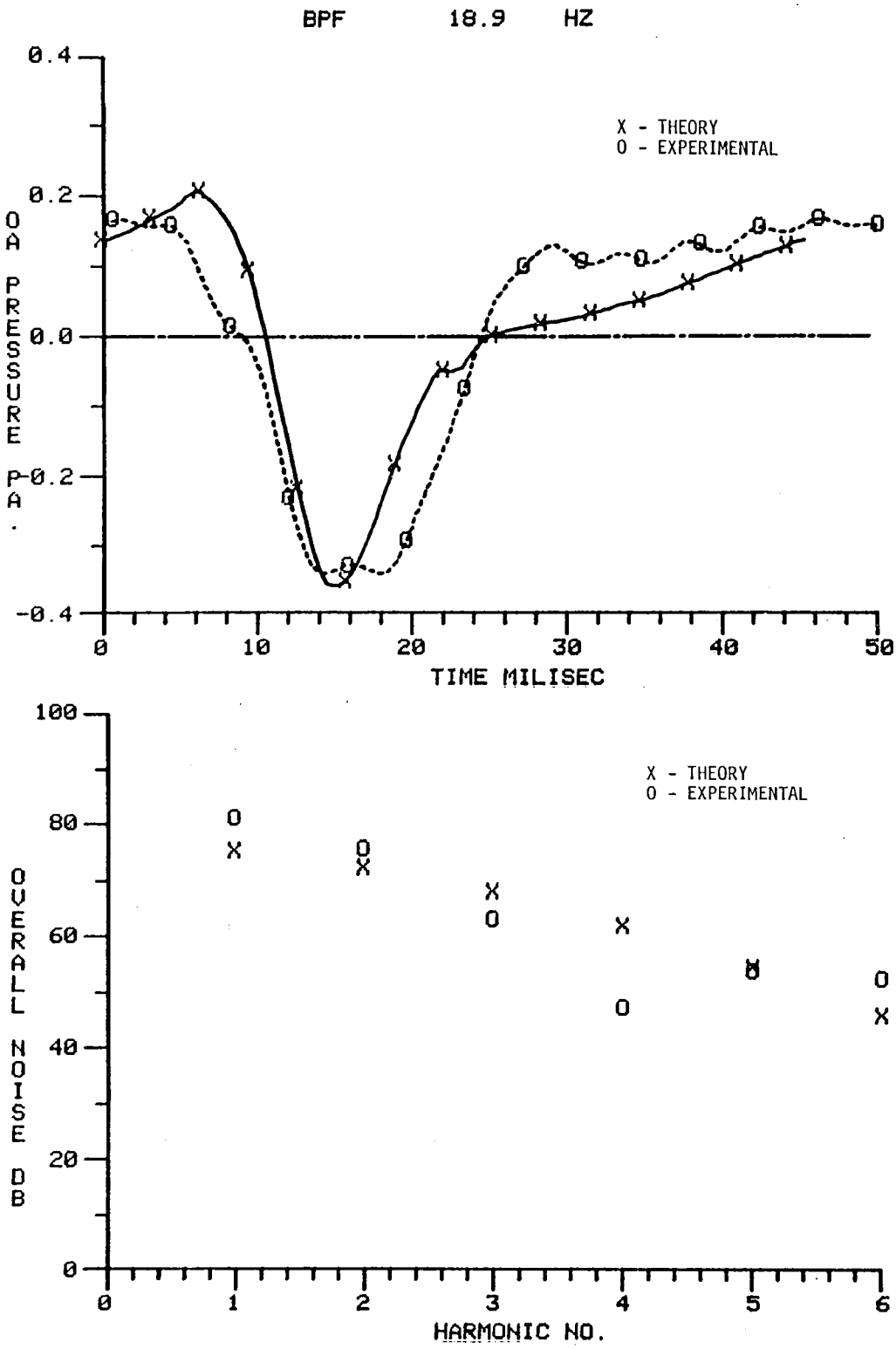


Figure 33. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, constant inflow model).

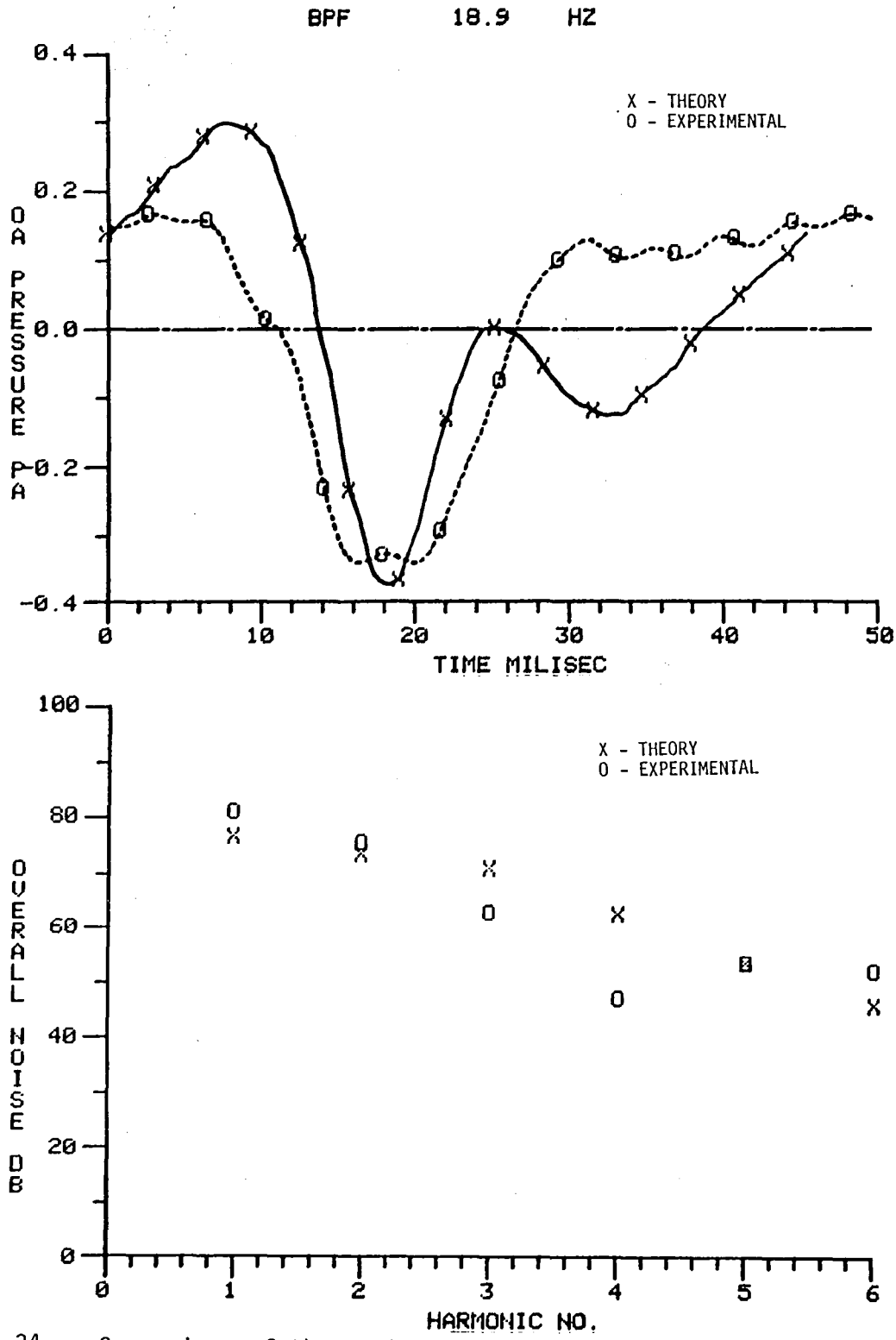


Figure 34. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

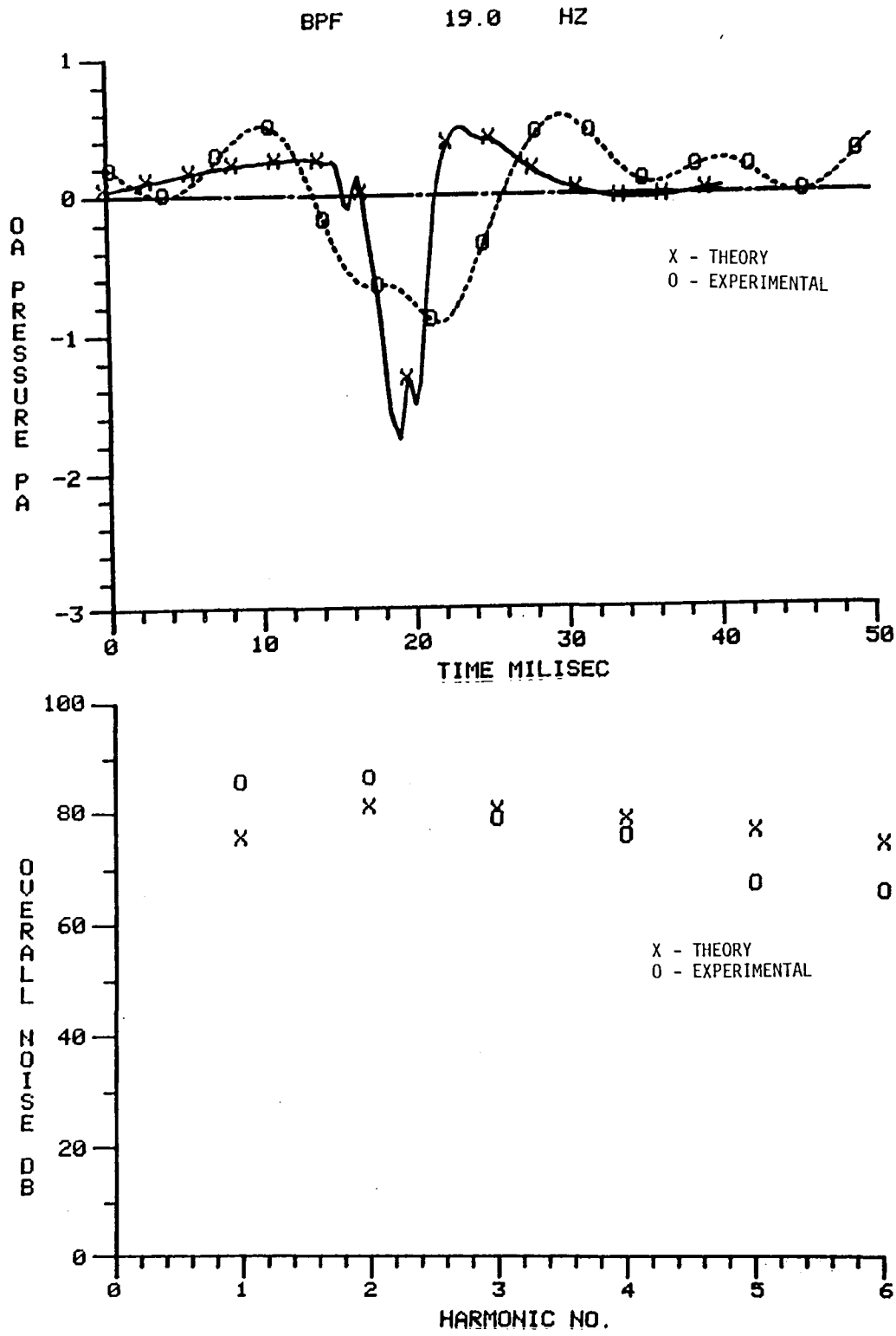


Figure 35. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (rigid blade, constant inflow model).

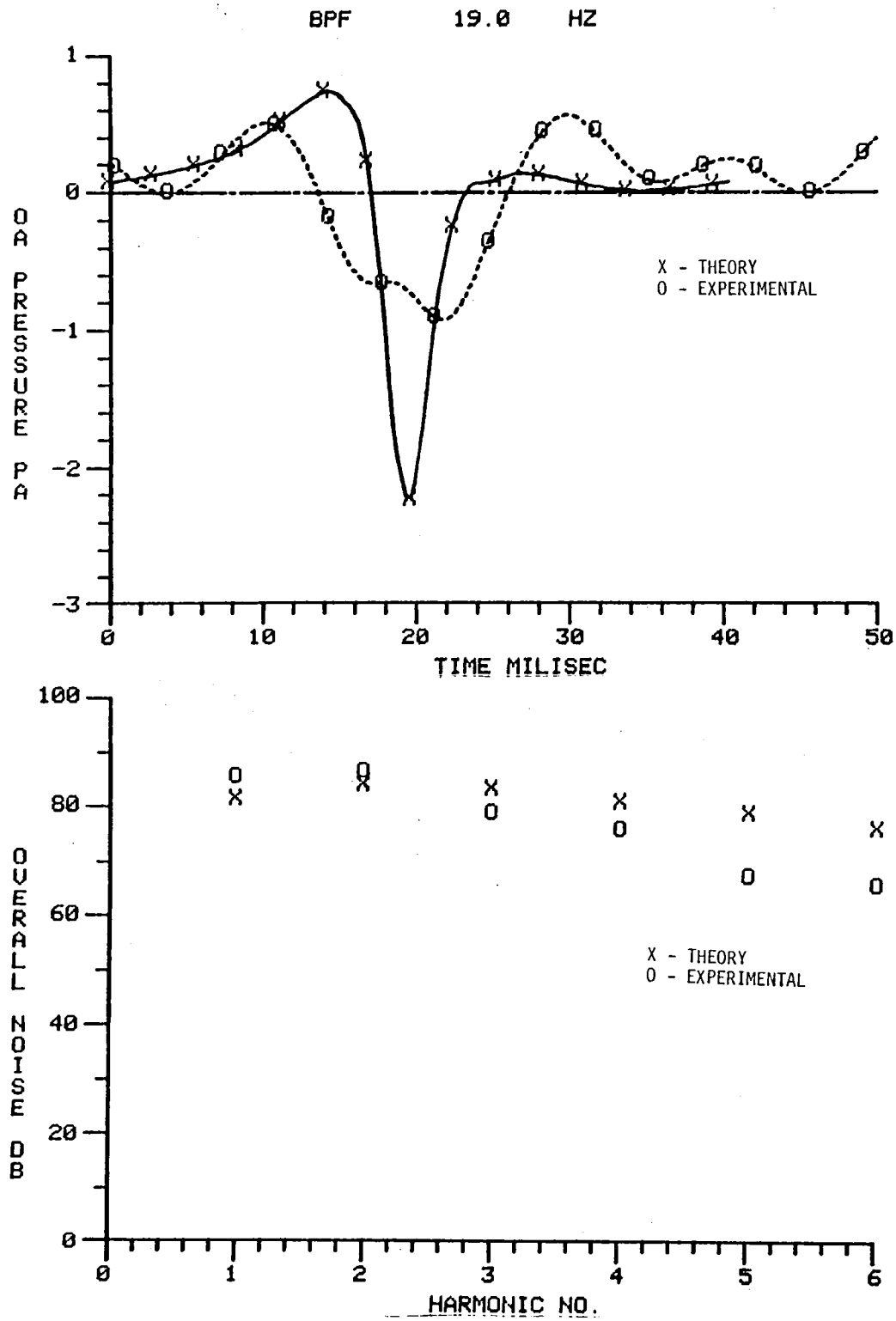


Figure 36. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, constant inflow model).

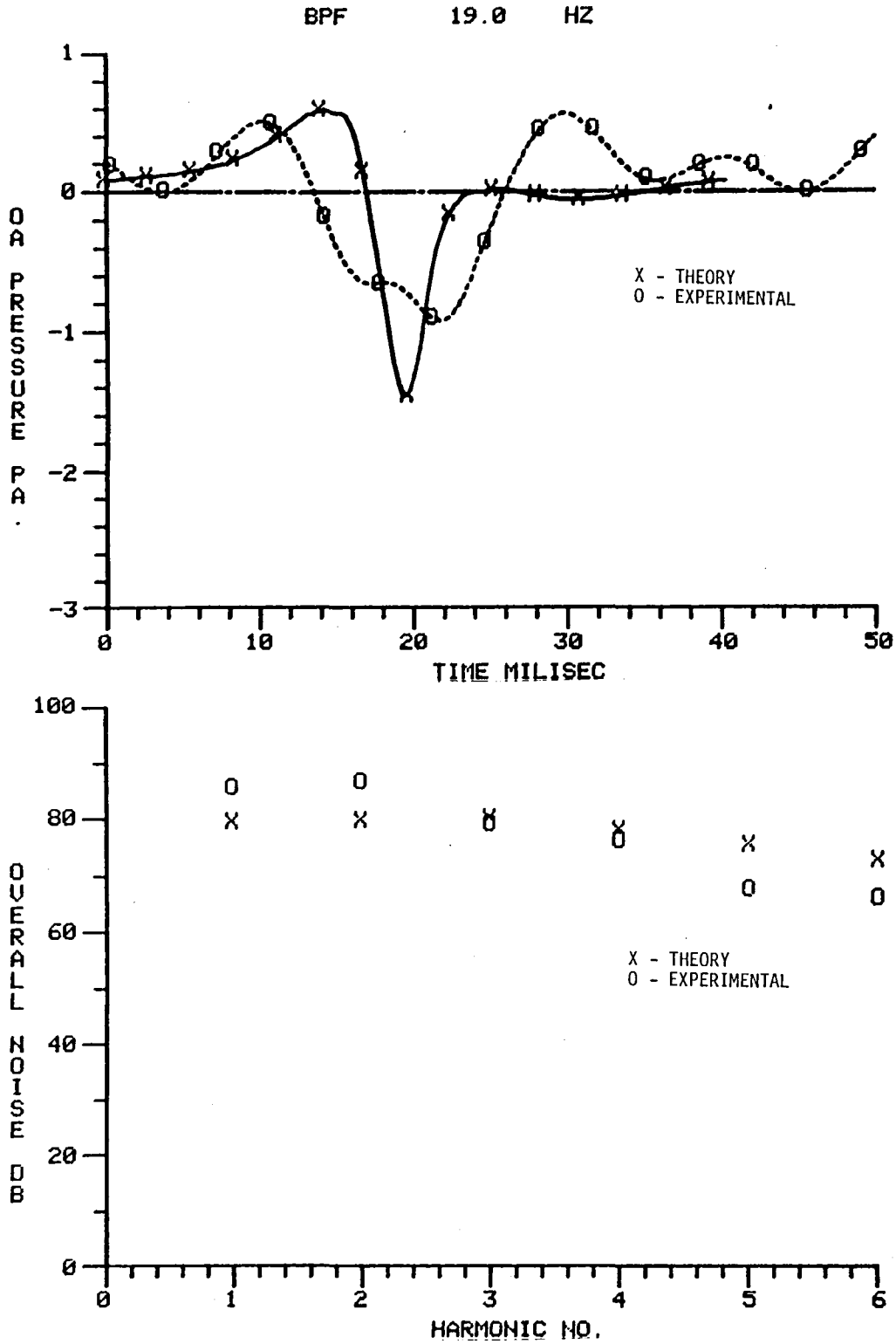


Figure 37. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

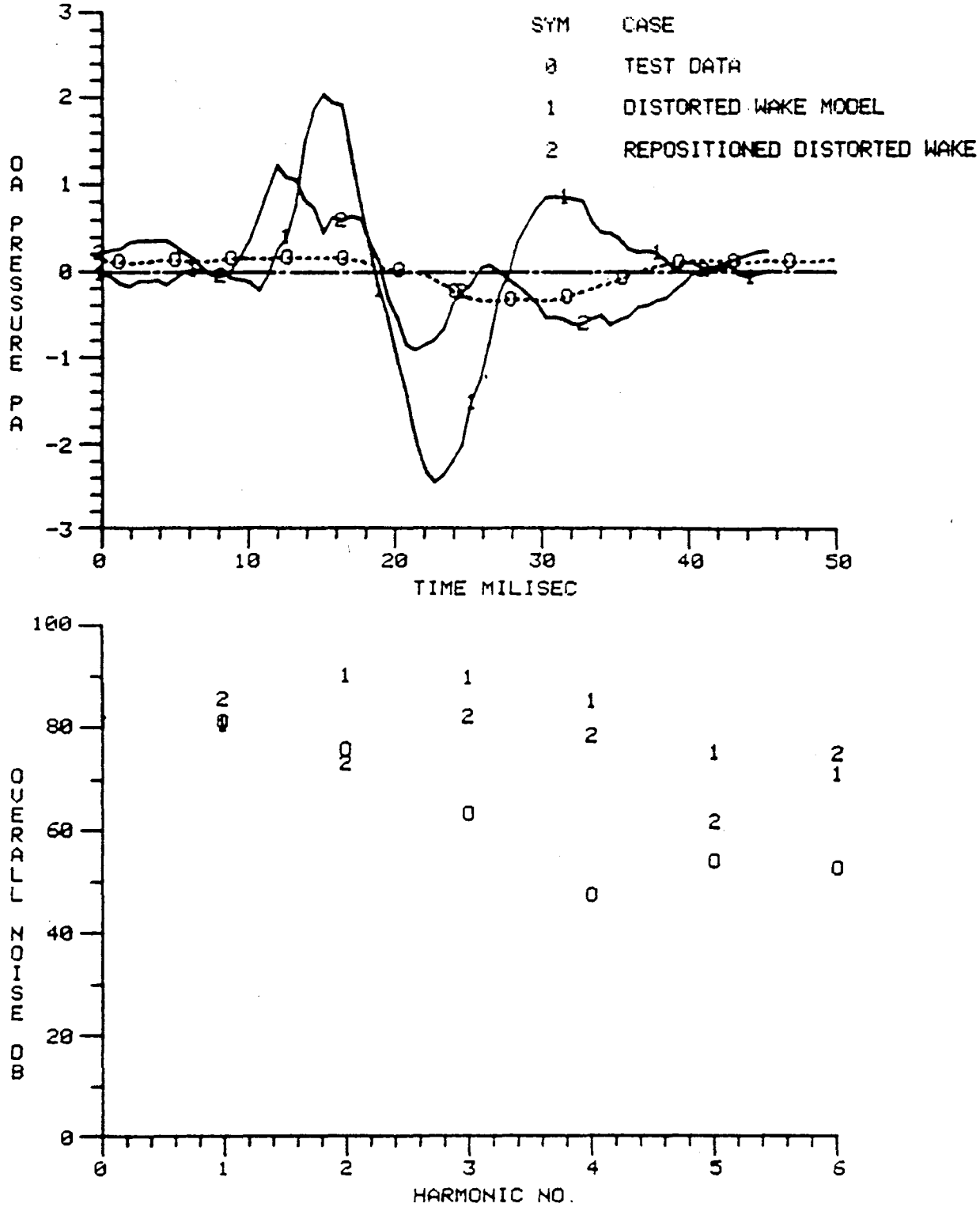


Figure 38. - Comparison of acoustic pressure predictions using the distorted wake geometry and the repositioned distorted wake geometry models for the CH-53A rotor at 95 knots.

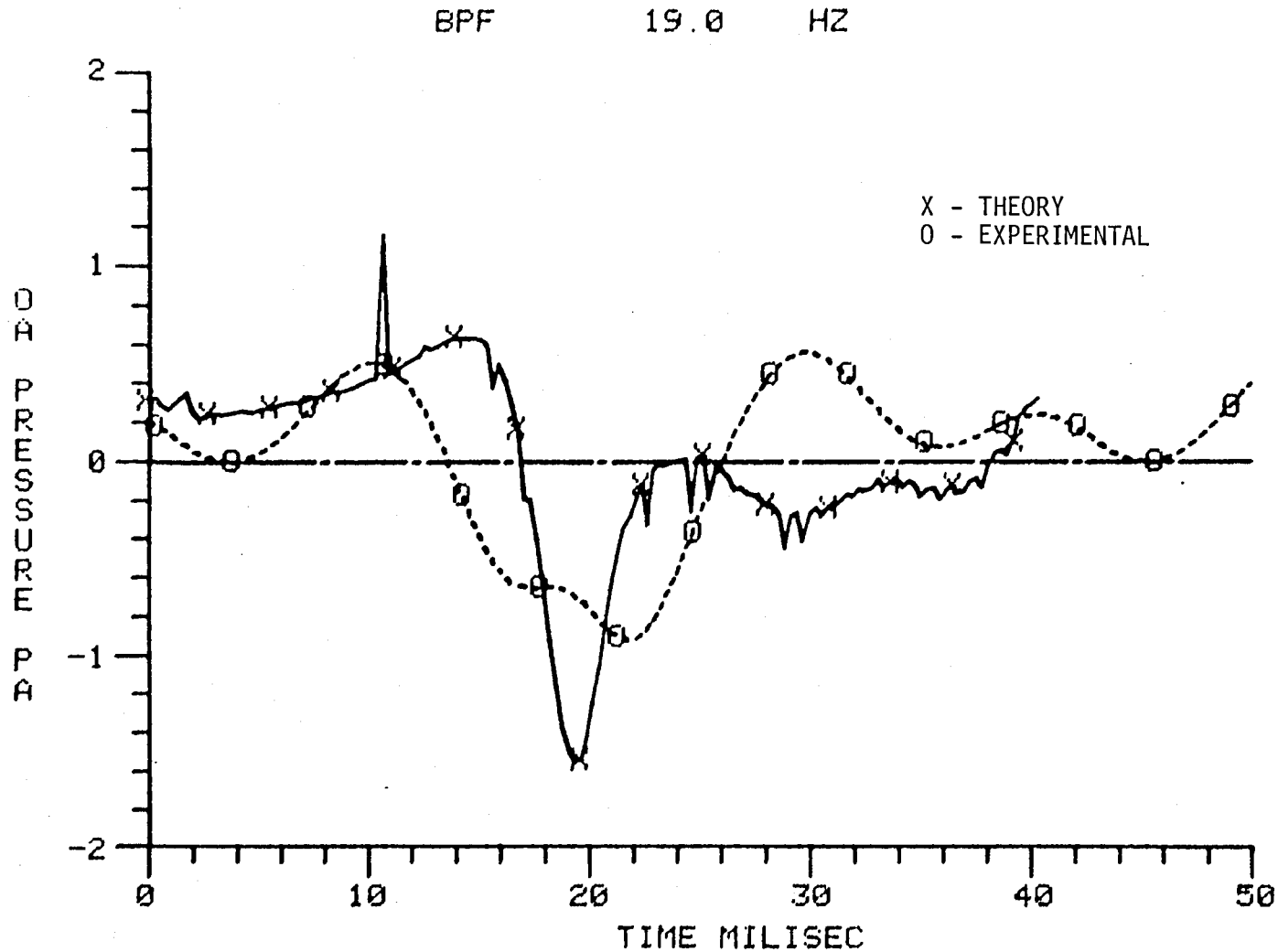


Figure 39. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 82.8m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model) with compressibility corrections.

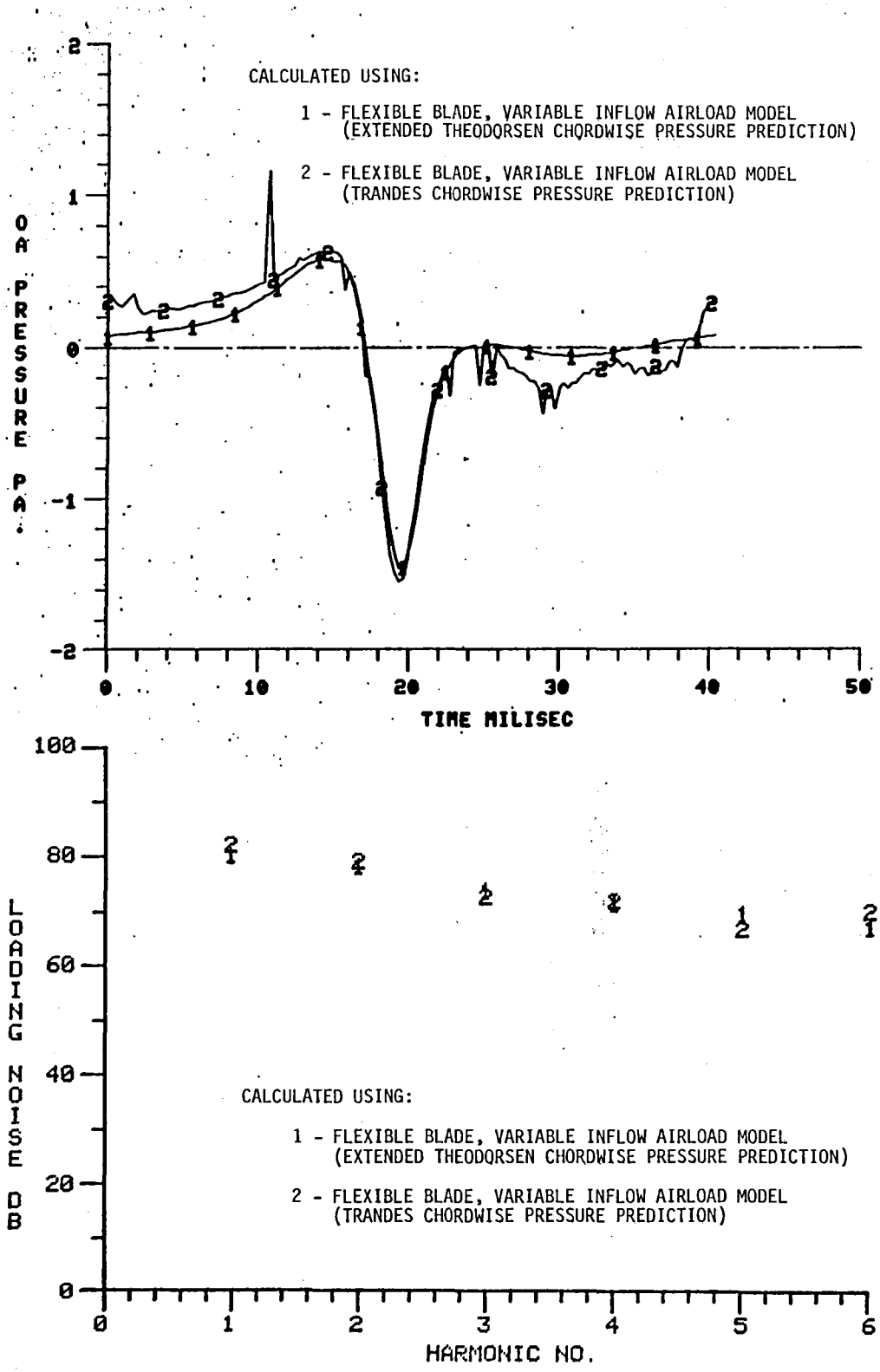


Figure 40. - Comparison of theoretical acoustic pressure signatures and spectra obtained using airload models with different corrections for compressibility. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

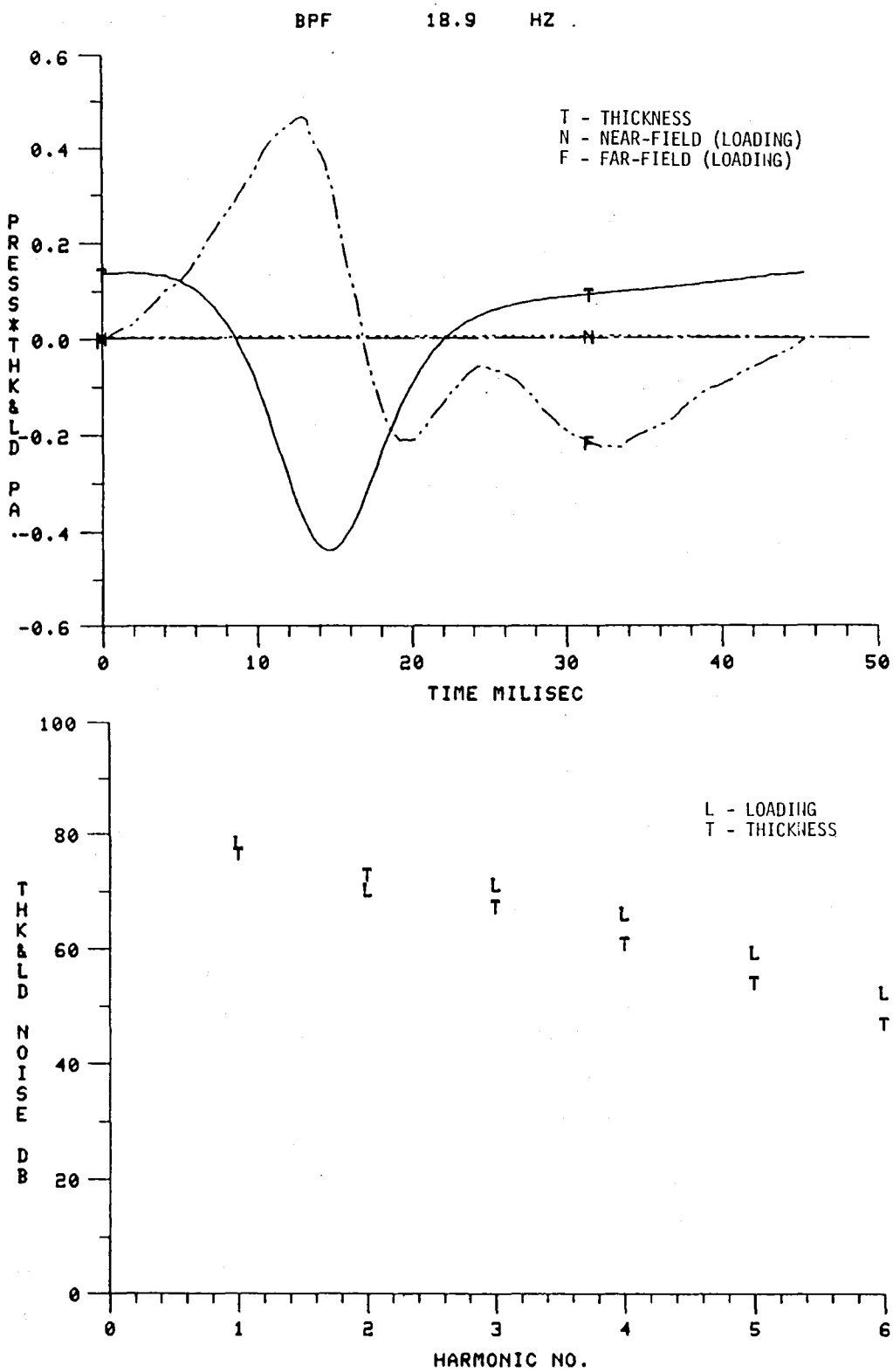


Figure 41. - Comparison of thickness and loading components of theoretical acoustic pressure signature and spectra. V - 48.9 m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Results obtained using flexible blade, variable inflow predicted airload model.

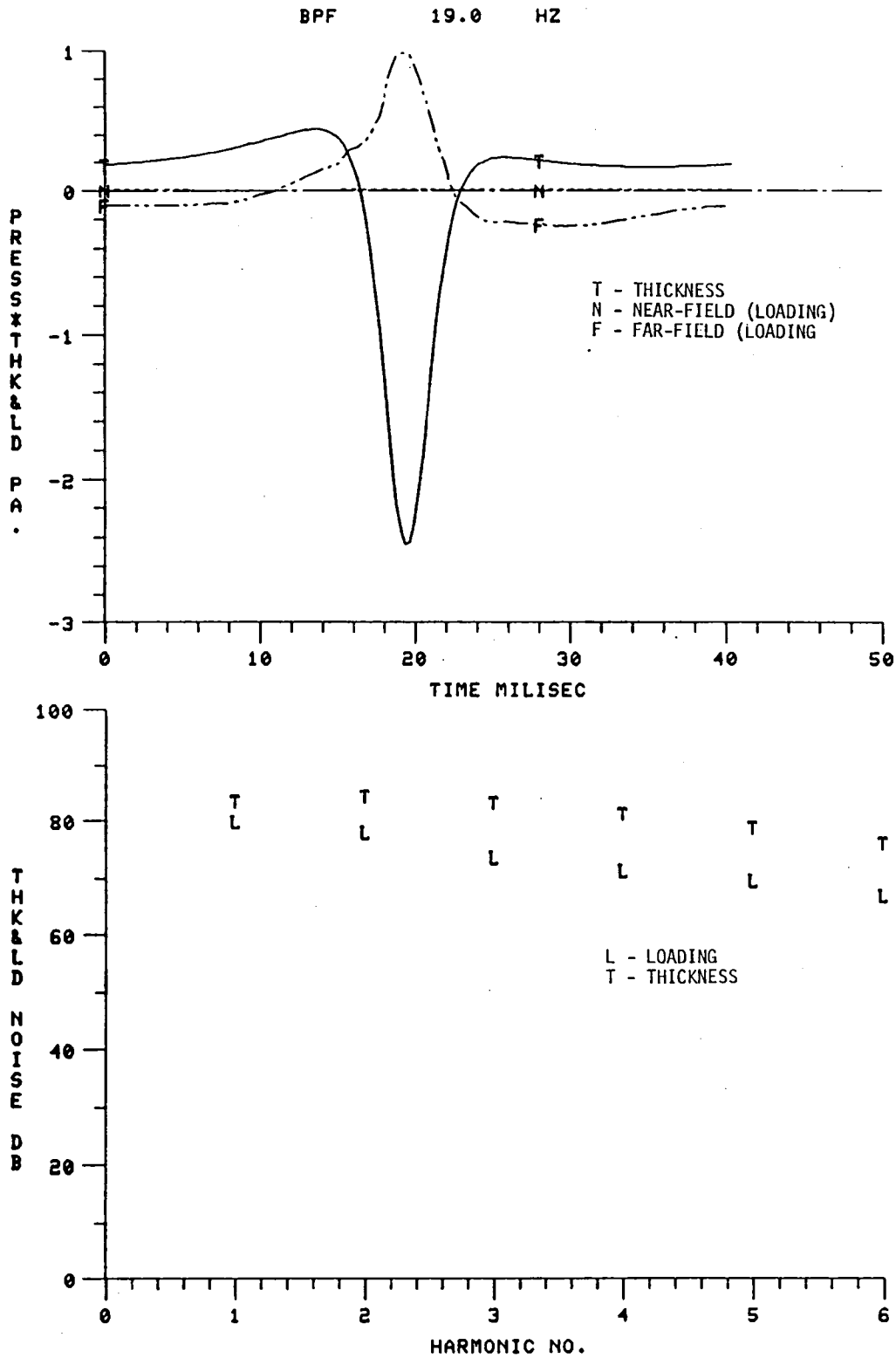


Figure 42. - Comparison of thickness and loading components of theoretical acoustic pressure signature and spectra. V = 82.3m/sec (160 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Results obtained using flexible vlade, variable inflow predicted airload model.

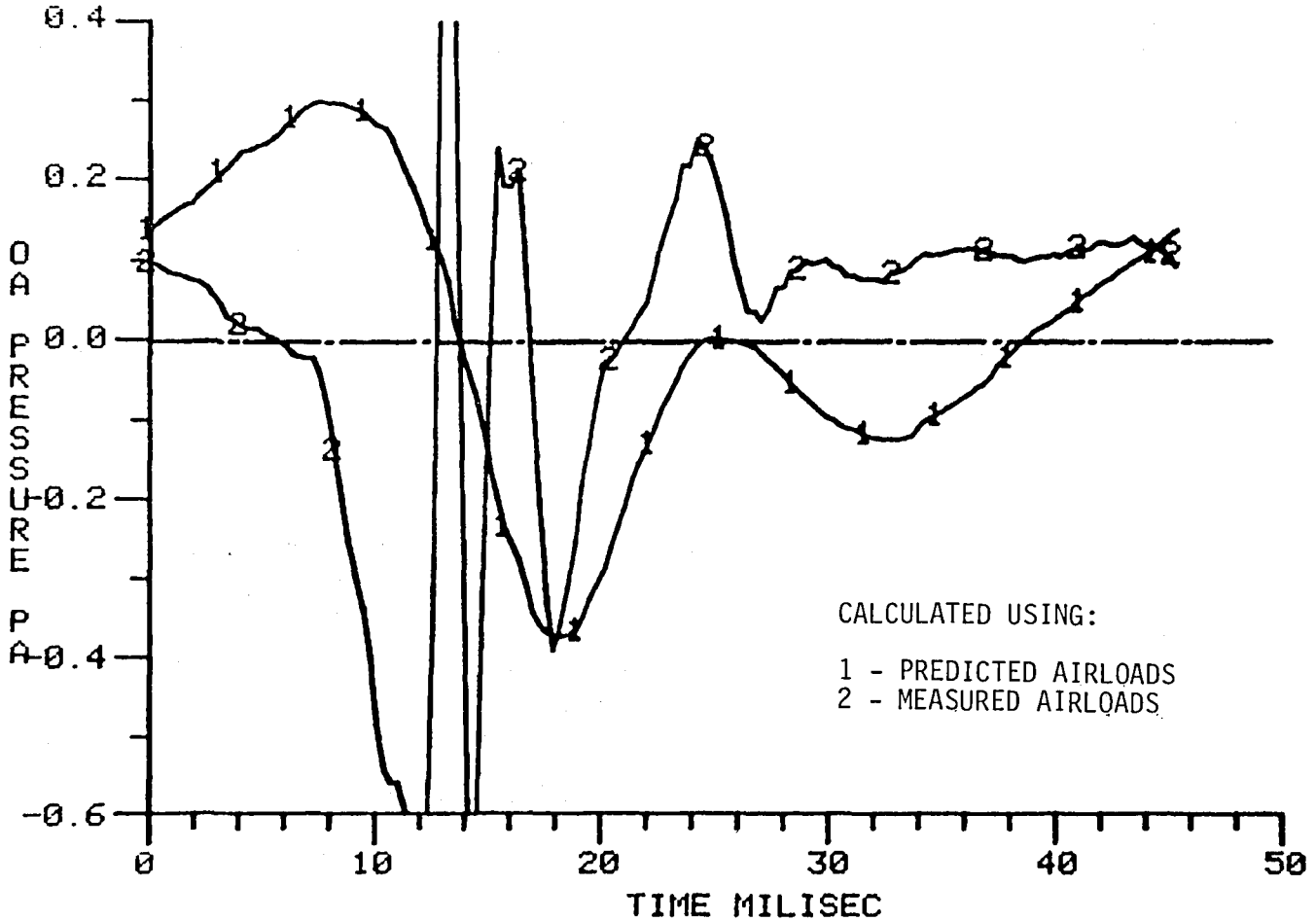


Figure 43. - Comparison of theoretical acoustic pressure signatures calculated using measured and predicted (flexible blade, variable inflow model) airload inputs. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

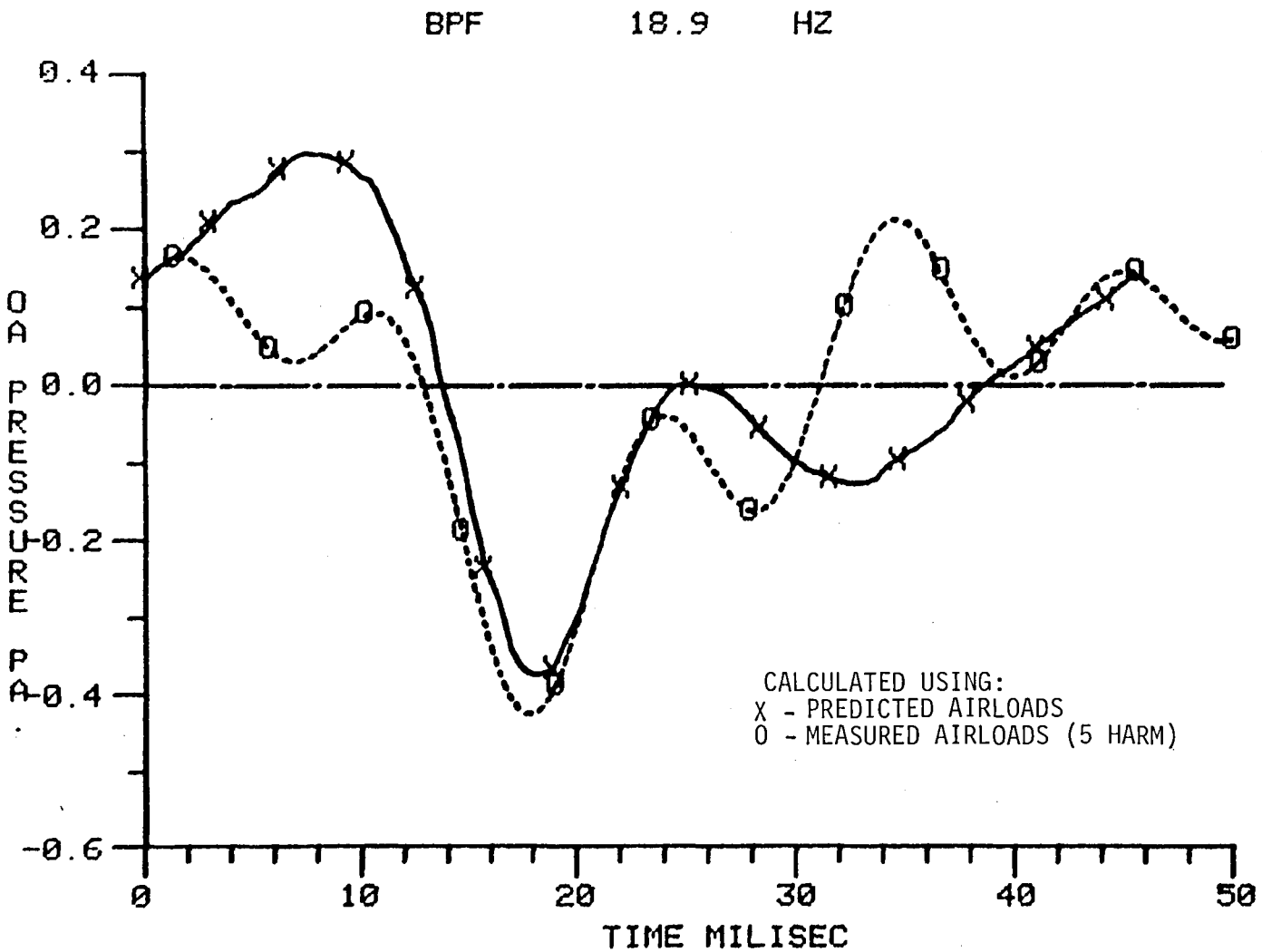


Figure 44. - Comparison of theoretical acoustic pressure signatures containing different numbers of harmonics. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

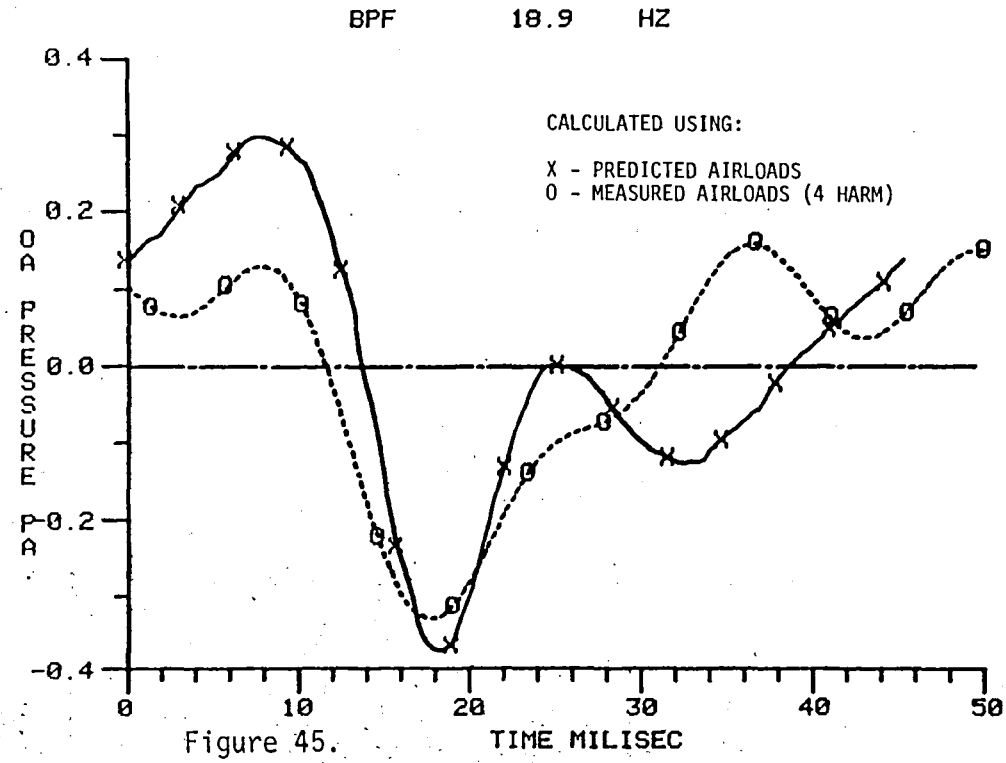


Figure 45.

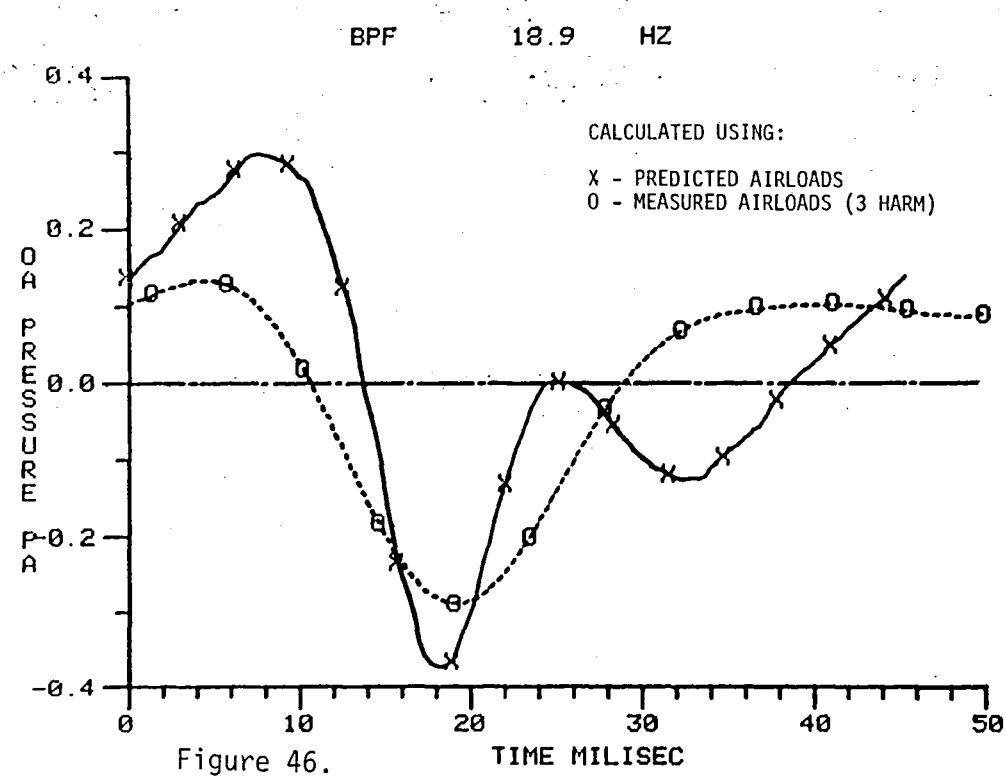


Figure 46.

Figures 45. & 46. - Comparison of theoretical acoustic pressure signature containing different numbers of harmonics. V - 48.9 m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

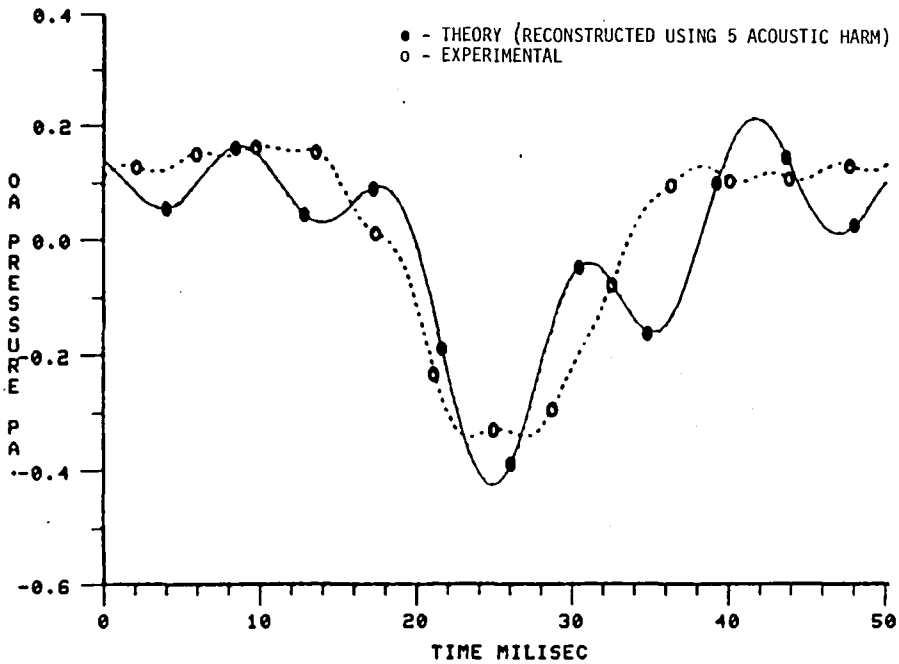


Figure 47. - Comparison of theoretical and experimental acoustic pressure signature. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using measured input airload with theoretical acoustic pressure signature being reconstructed using first 5 harmonics of output harmonic spectra.

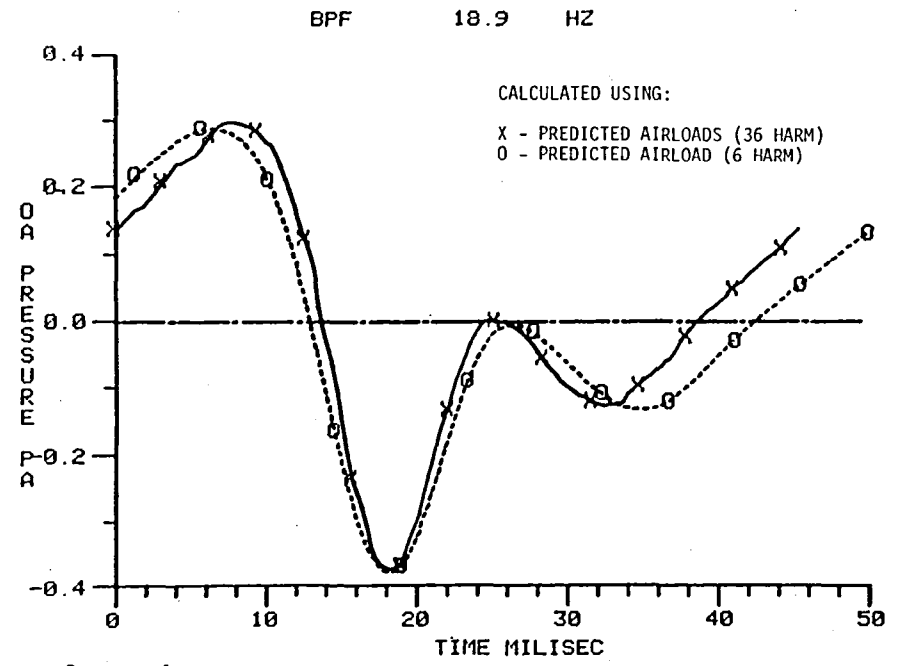


Figure 48. - Comparison of theoretical acoustic pressure signatures containing different numbers of harmonics. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (200 ft) ahead of helicopter.

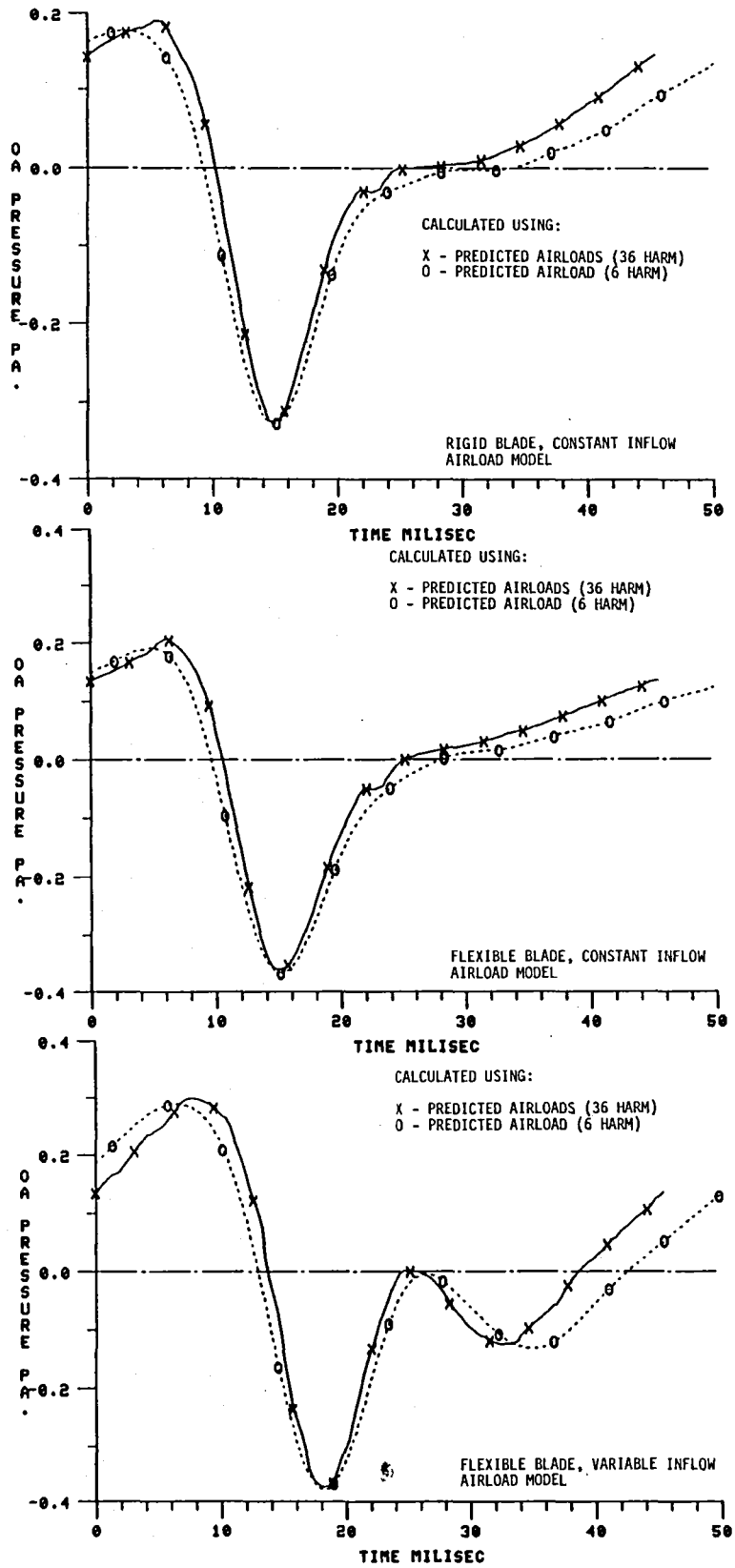


Figure 49. - Comparison of theoretical acoustic pressure signatures containing different numbers of harmonics. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

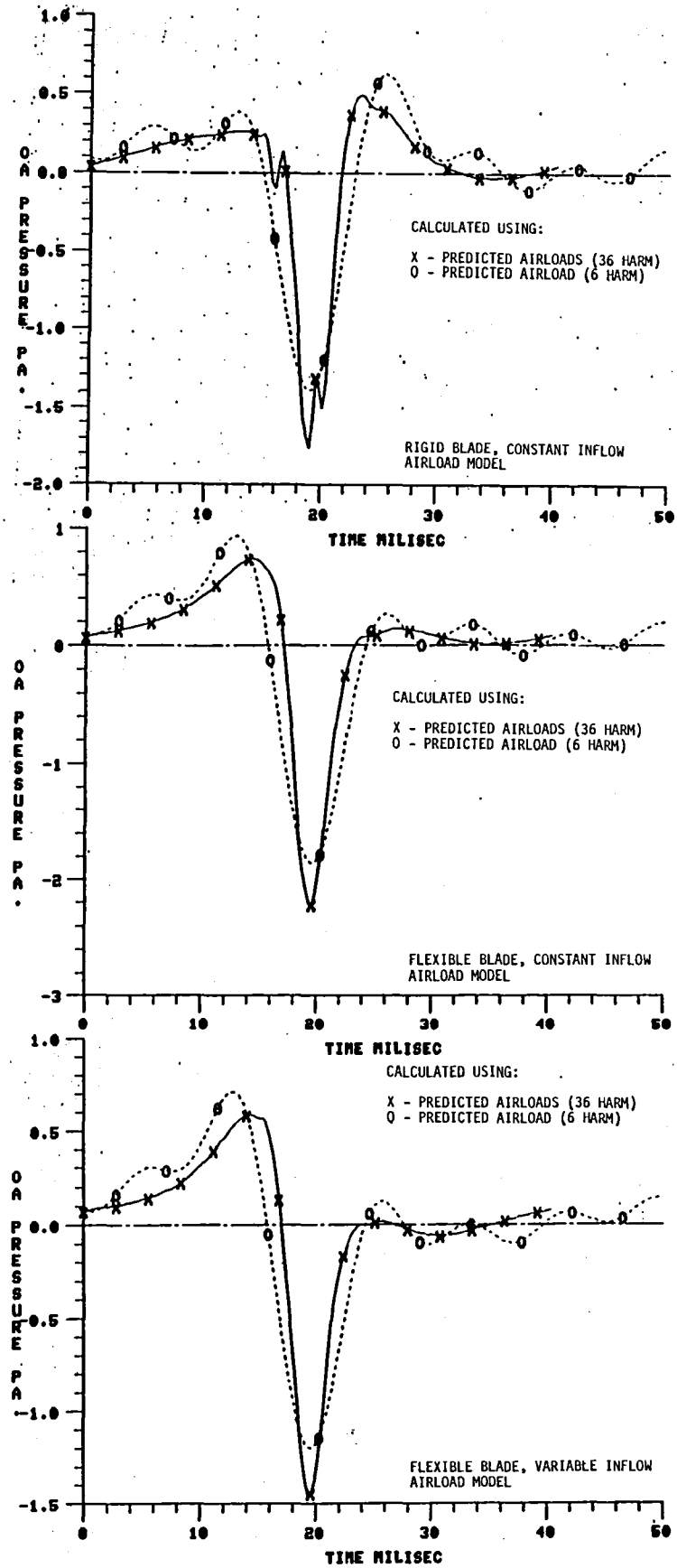


Figure 50. - Comparison of theoretical acoustic pressure signatures containing different numbers of harmonics. V = 82.3m/sec (160 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

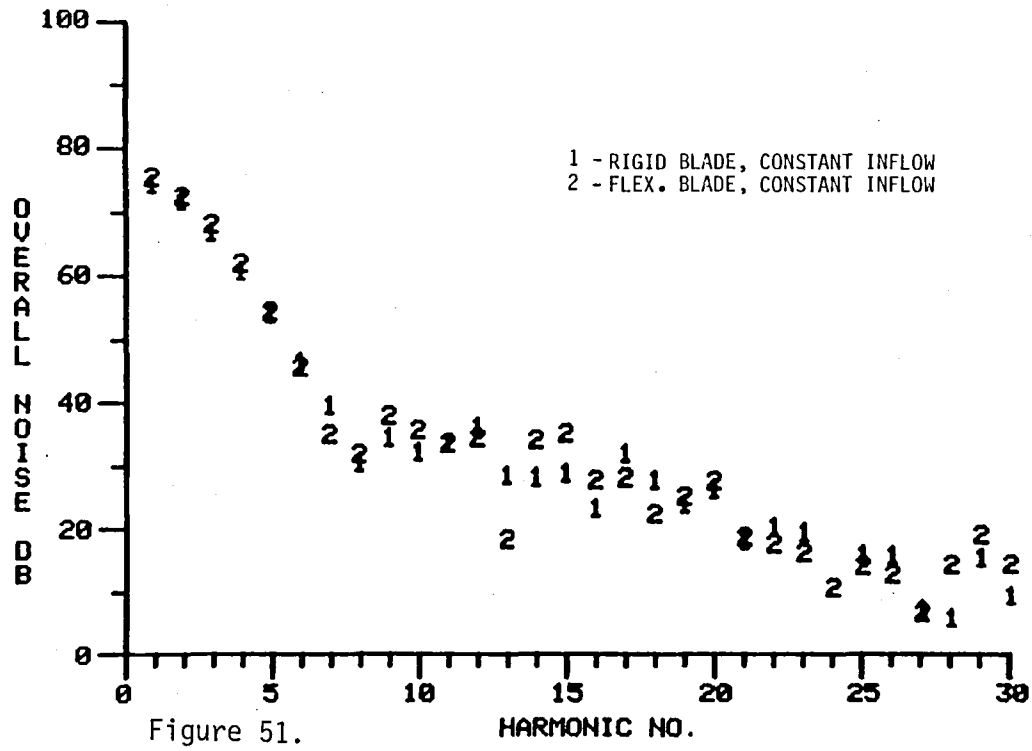


Figure 51.

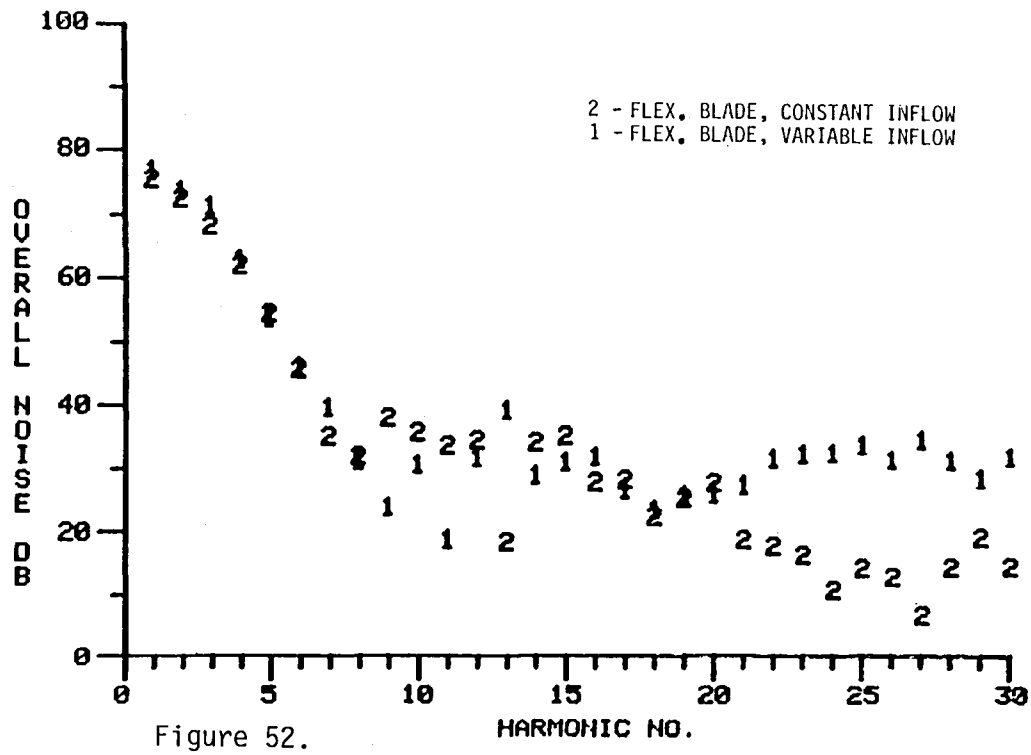


Figure 52.

Figure 51. & 52. - Comparison of first 30 harmonics of theoretical harmonic spectra calculated using rigid and flexible blade, constant and variable inflow predicted input airload models. V = 48.9 m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

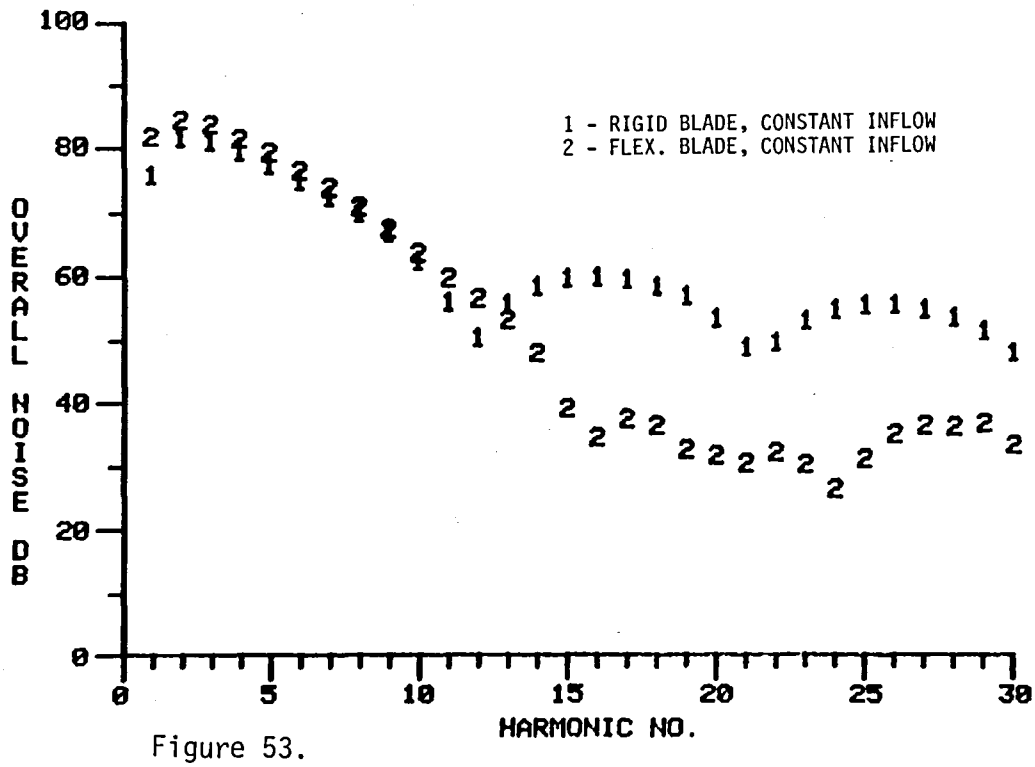


Figure 53.

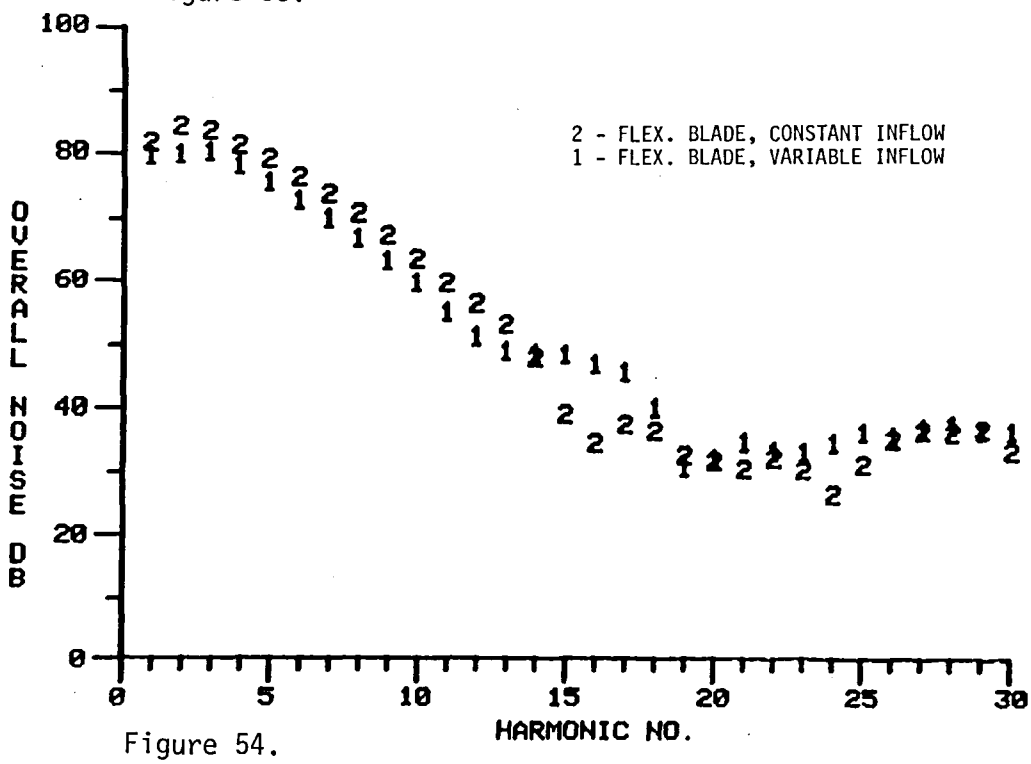


Figure 54.

Figures 53. & 54. - Comparison of first 30 harmonics of theoretical harmonic spectra calculated using rigid and flexible blade, constant and variable inflow predicted input airload models. V = 82.3m/sec (160 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

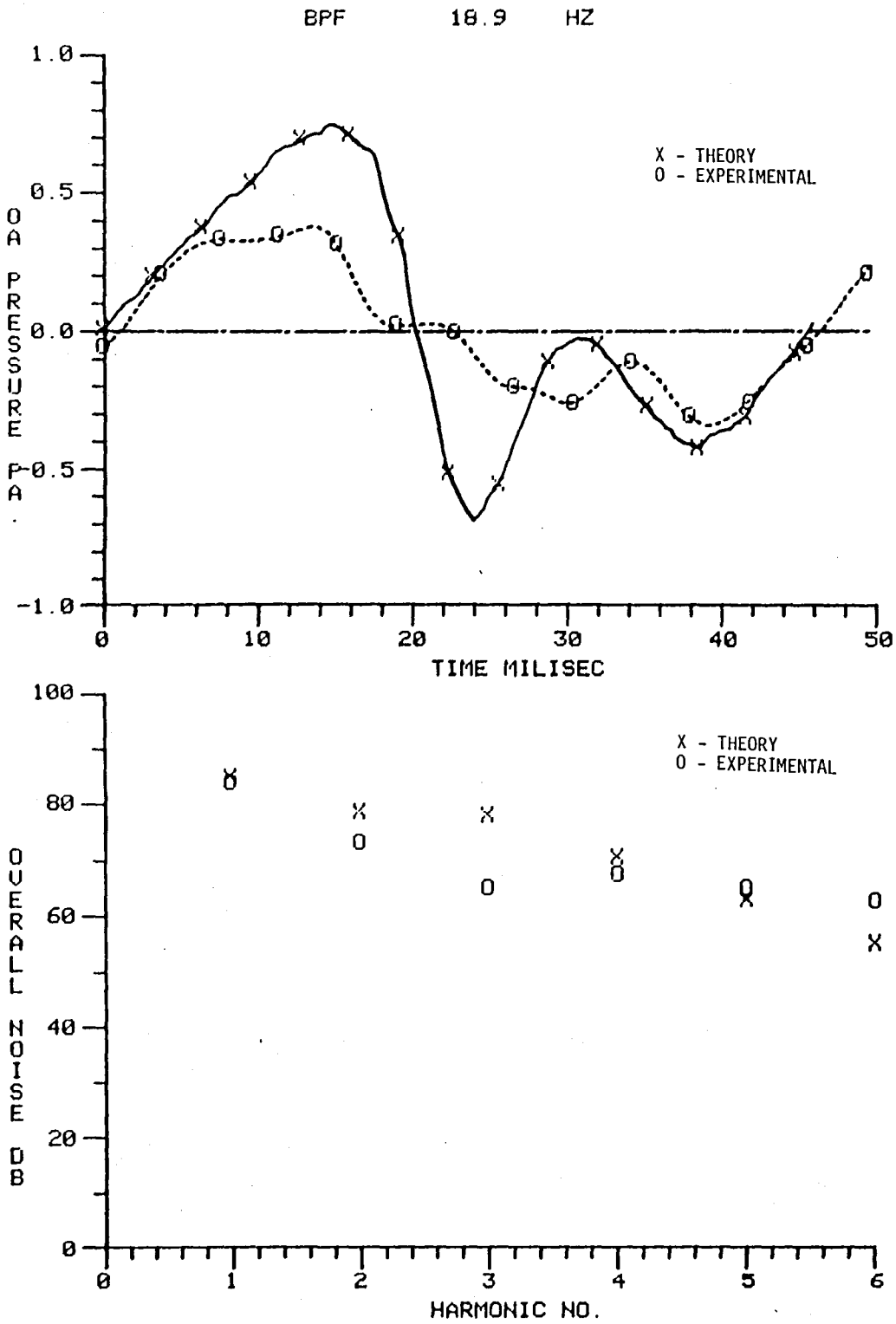


Figure 55. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (100 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

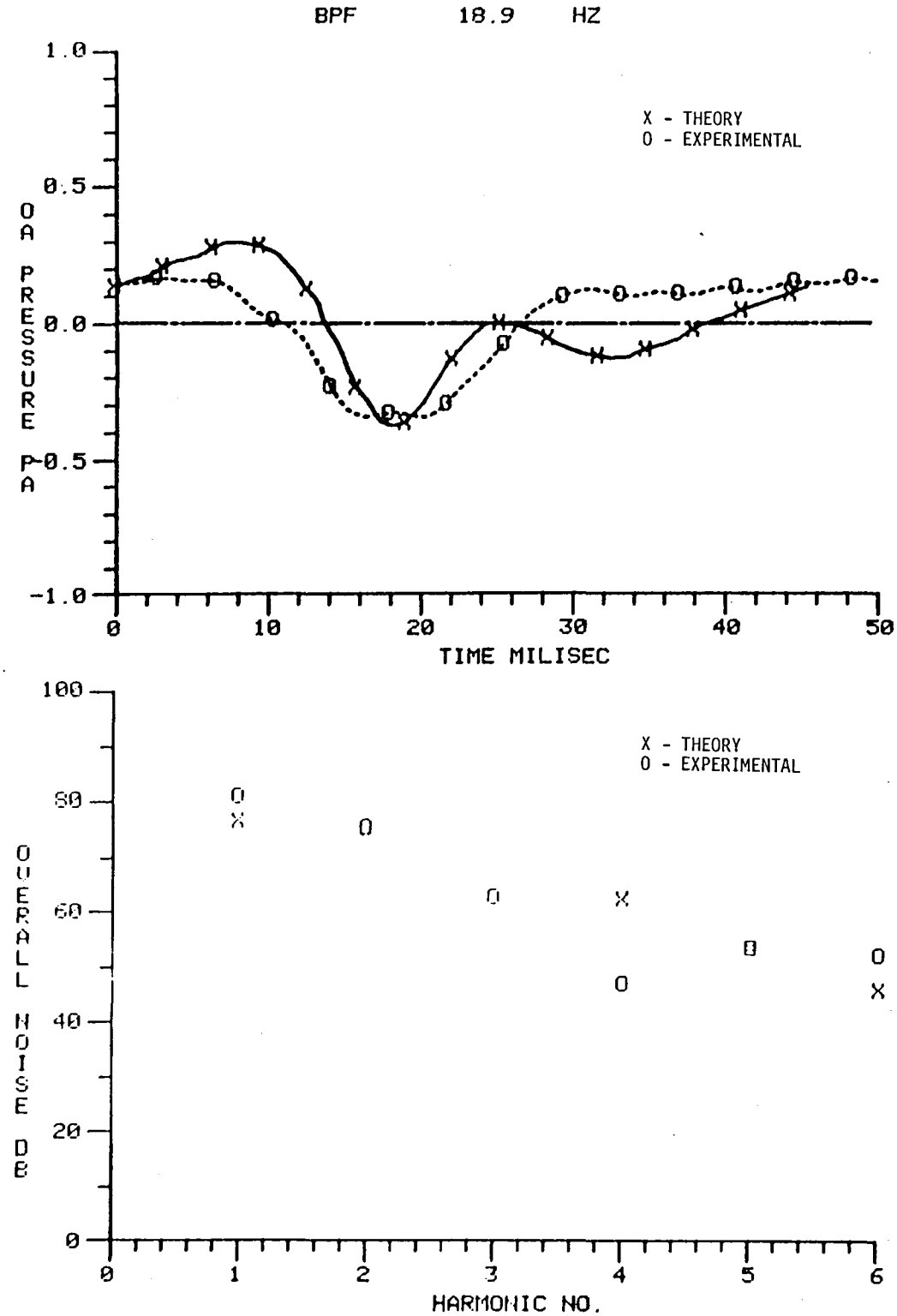


Figure 56. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

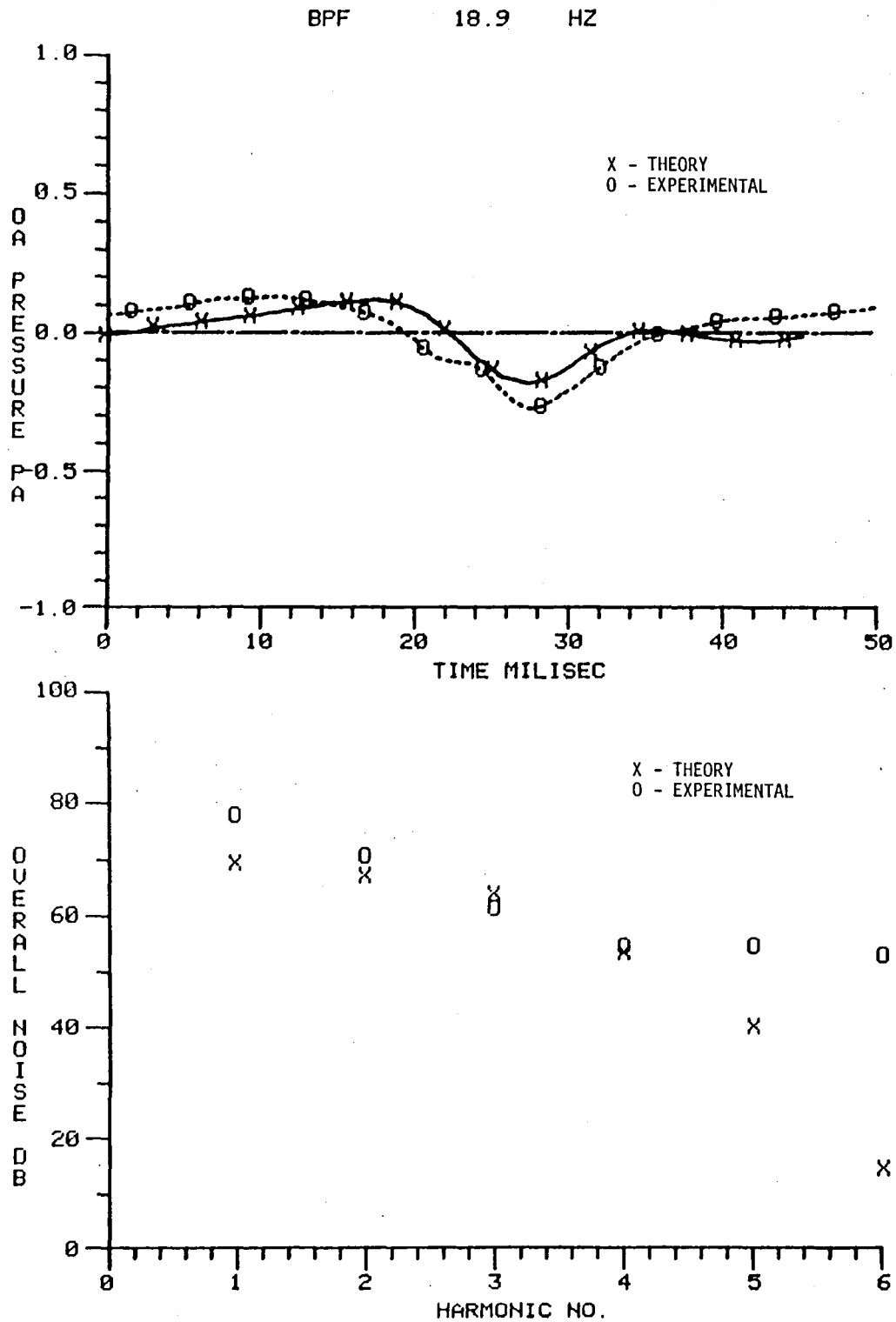


Figure 57. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

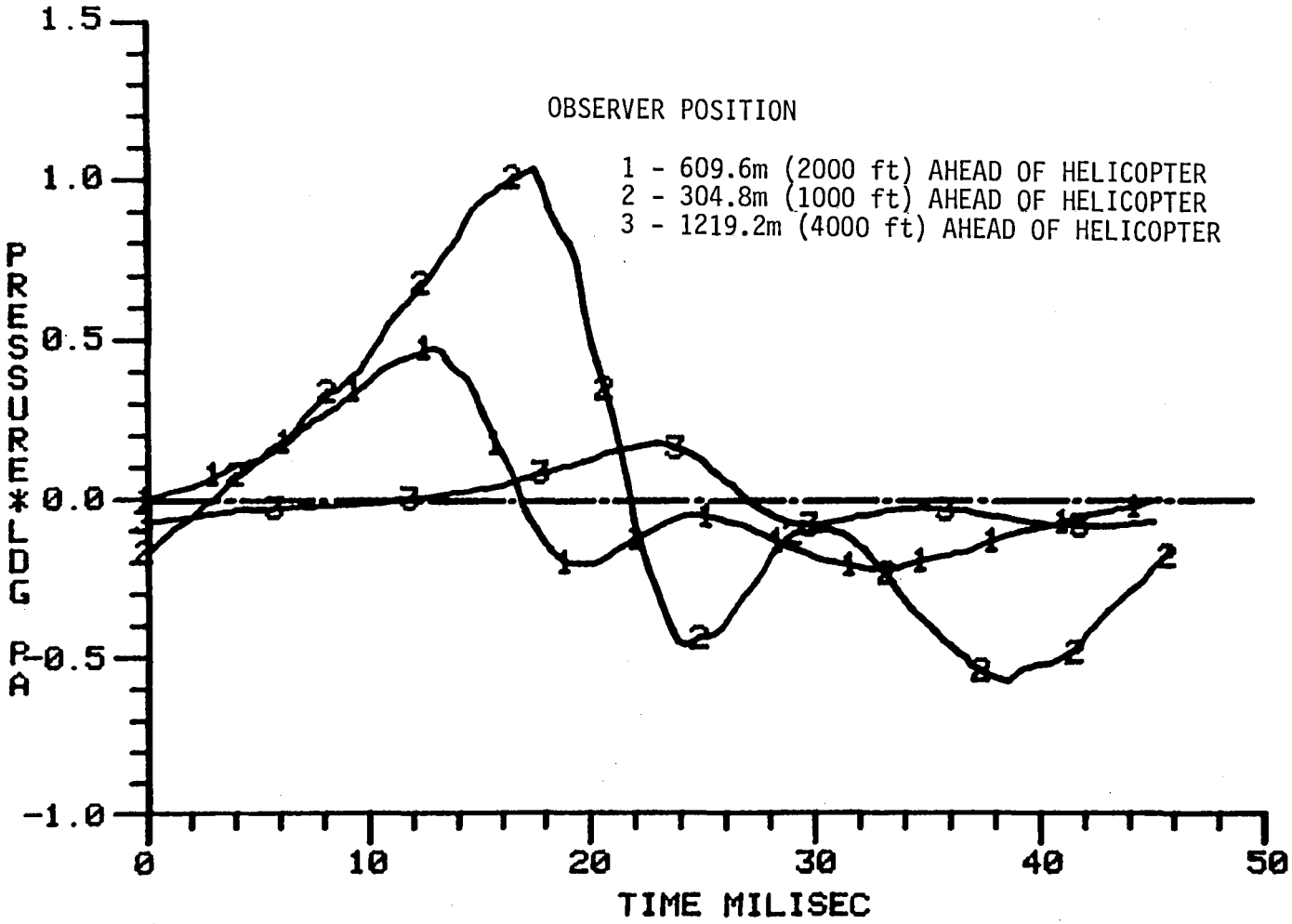


Figure 58. - Comparison of theoretical acoustic pressure signature for various observer positions. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Results obtained using flexible blade variable inflow predicted airload model.

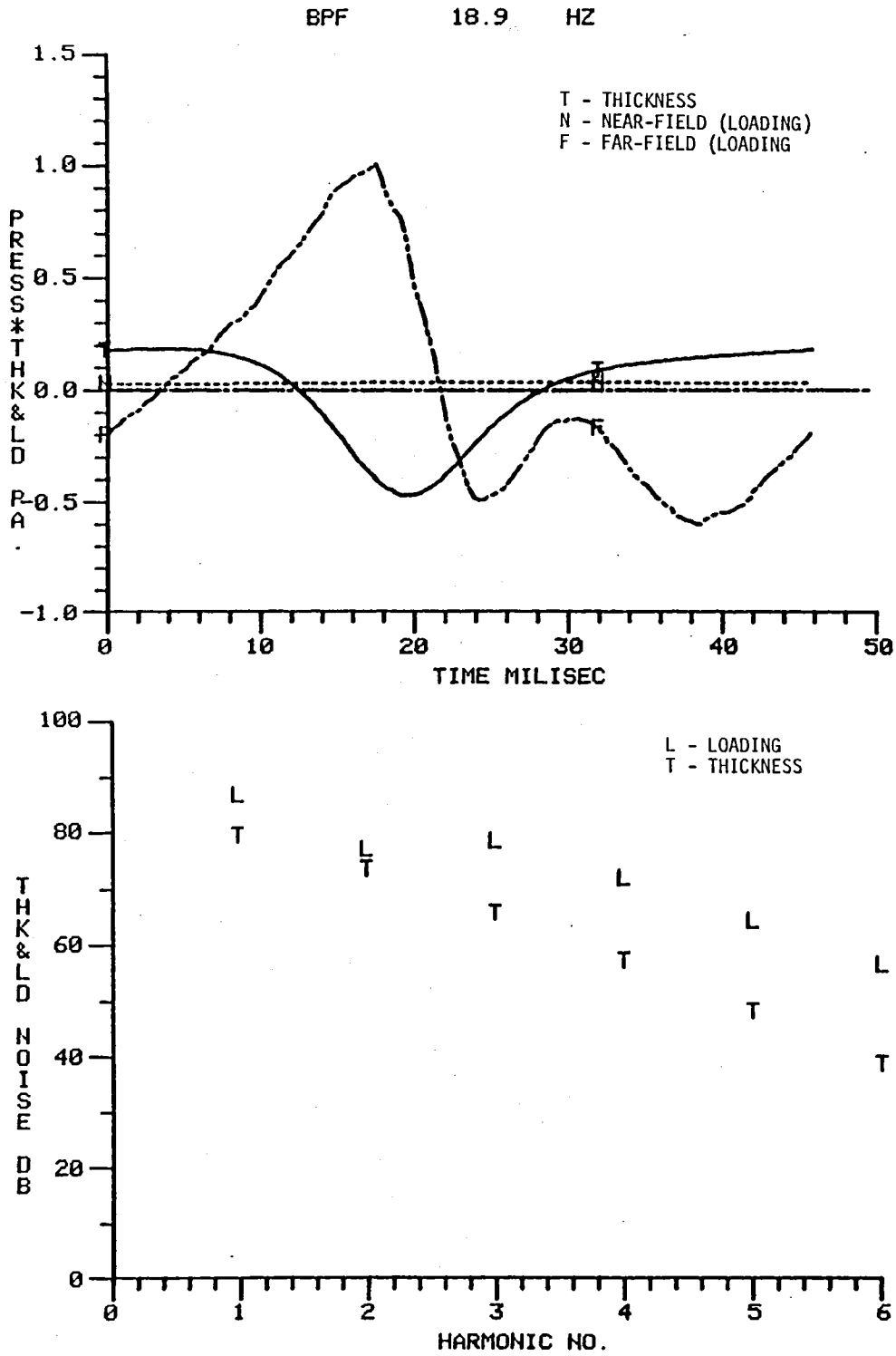


Figure 59. - Comparison of thickness and loading components of theoretical acoustic pressure signature and spectra. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter. Results obtained using flexible vlade, variable inflow predicted airload model.

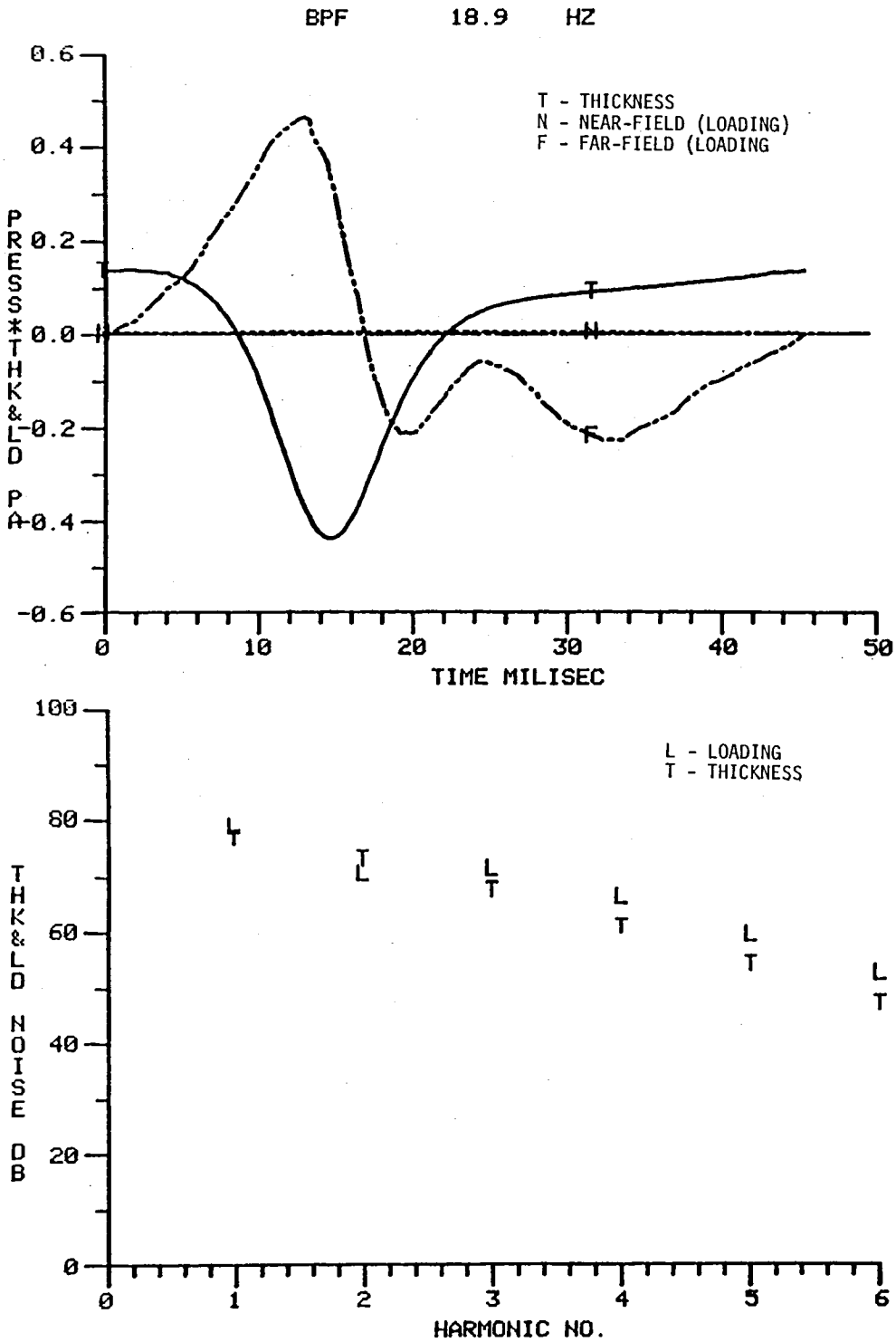


Figure 60. - Comparison of thickness and loading components of theoretical acoustic pressure signature and spectra. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Results obtained using flexible vlade, variable inflow predicted airload model.

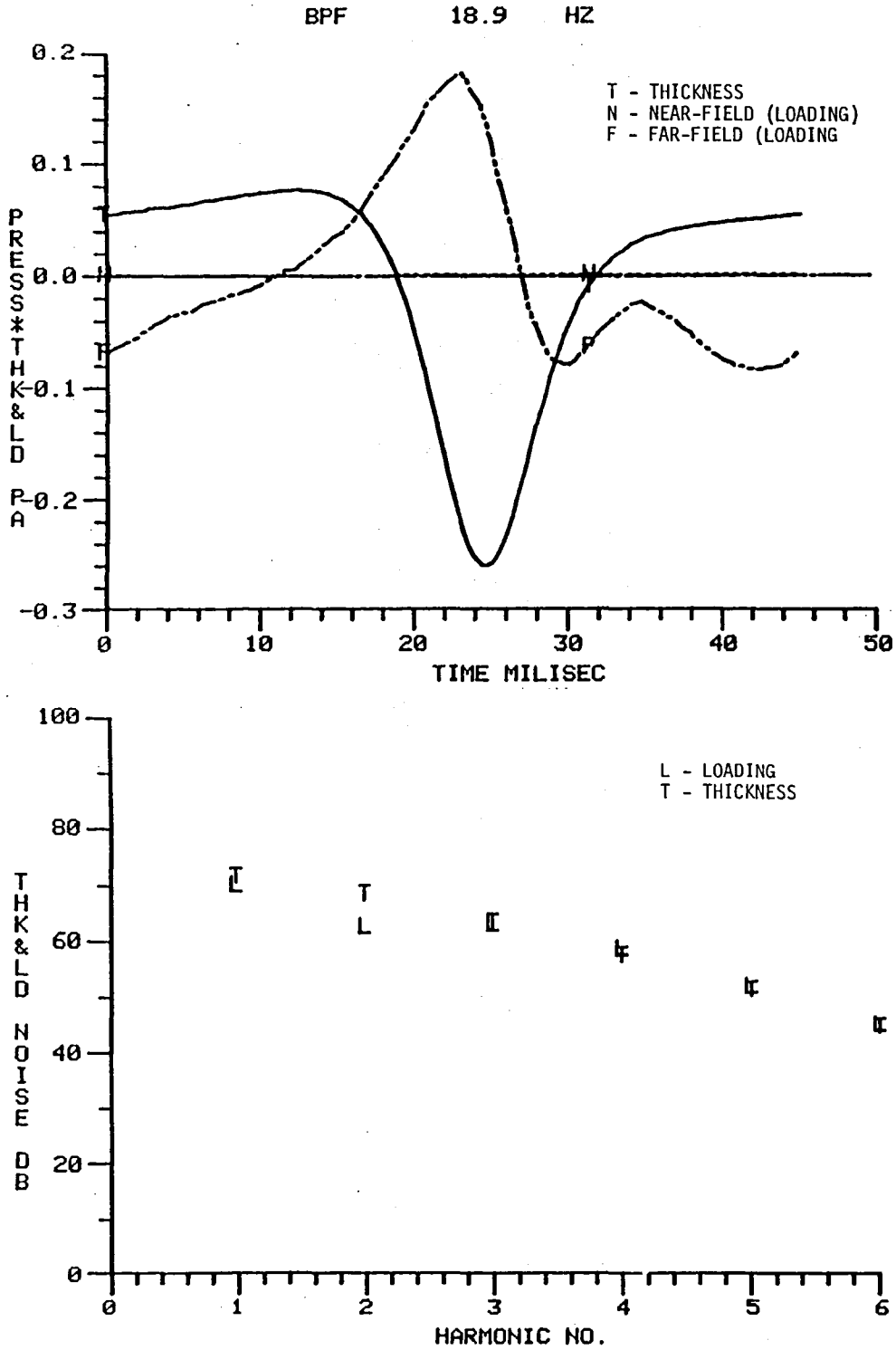
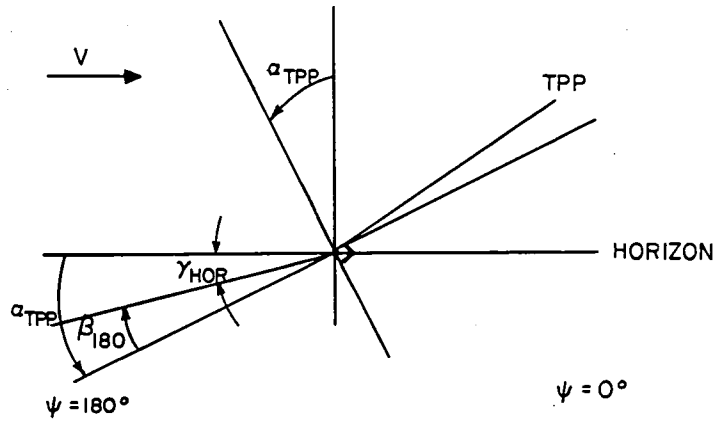


Figure 61. - Comparison of thickness and loading components of theoretical acoustic pressure signature and spectra. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter. Results obtained using flexible vlade, variable inflow predicted airload model.

ROTOR SPATIAL ORIENTATION



$$\beta = a_0 - a_1 \cos\psi - b_1 \sin\psi$$

$$\gamma_{HOR} = \alpha_{TPP} + \beta_{180}$$

ROTOR/OBSERVER GEOMETRY

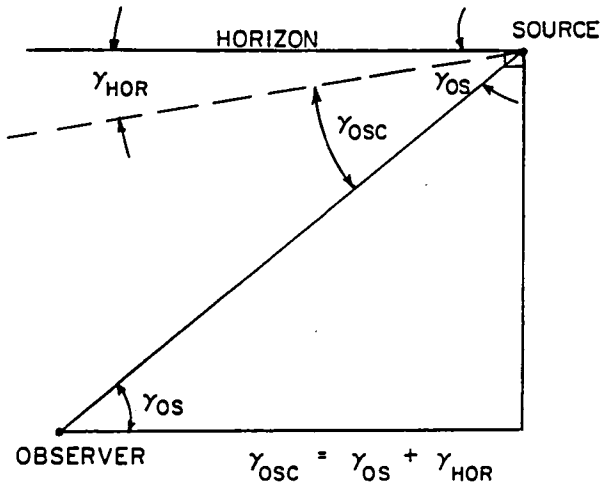


Figure 62.

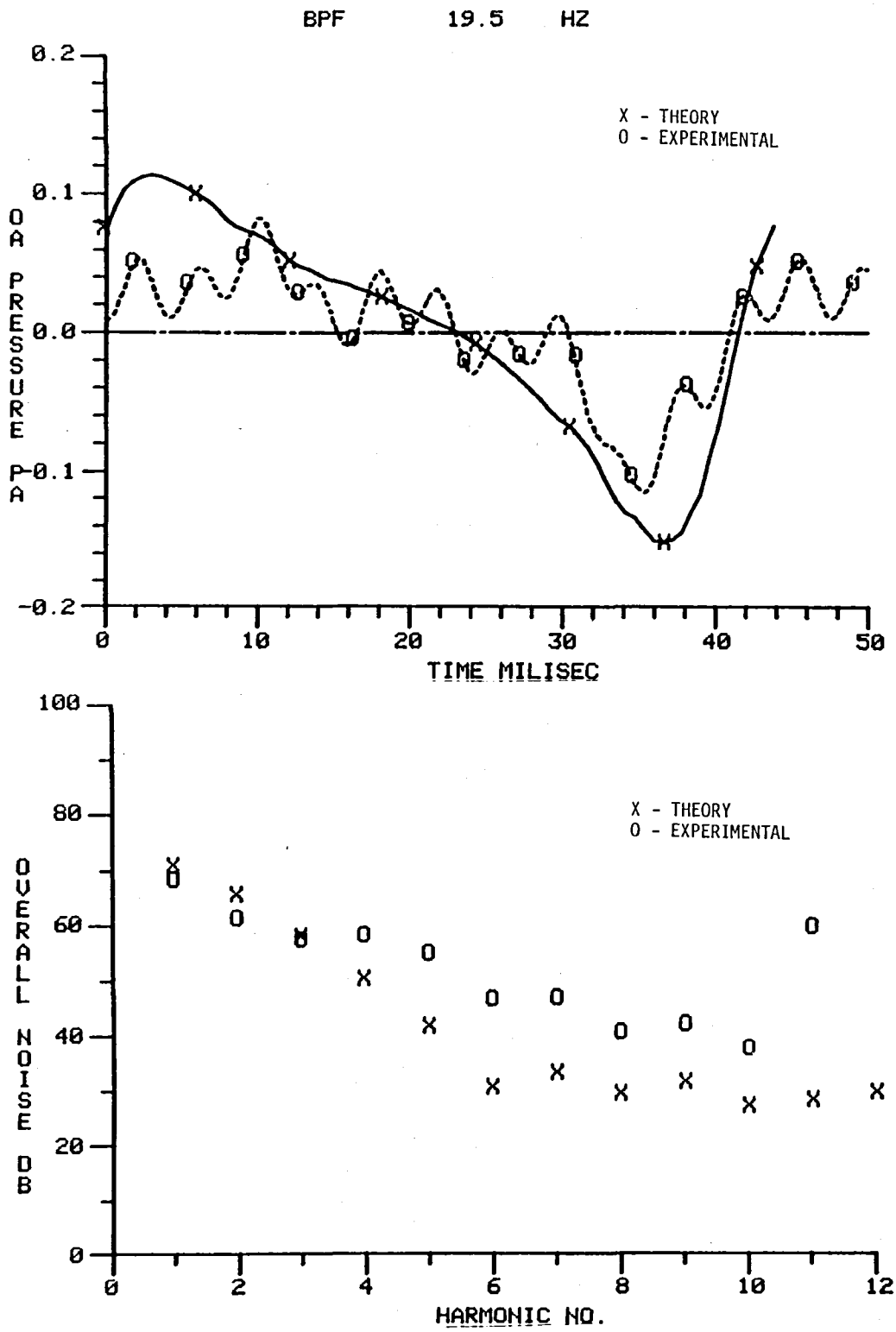


Figure 63. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, constant inflow model).

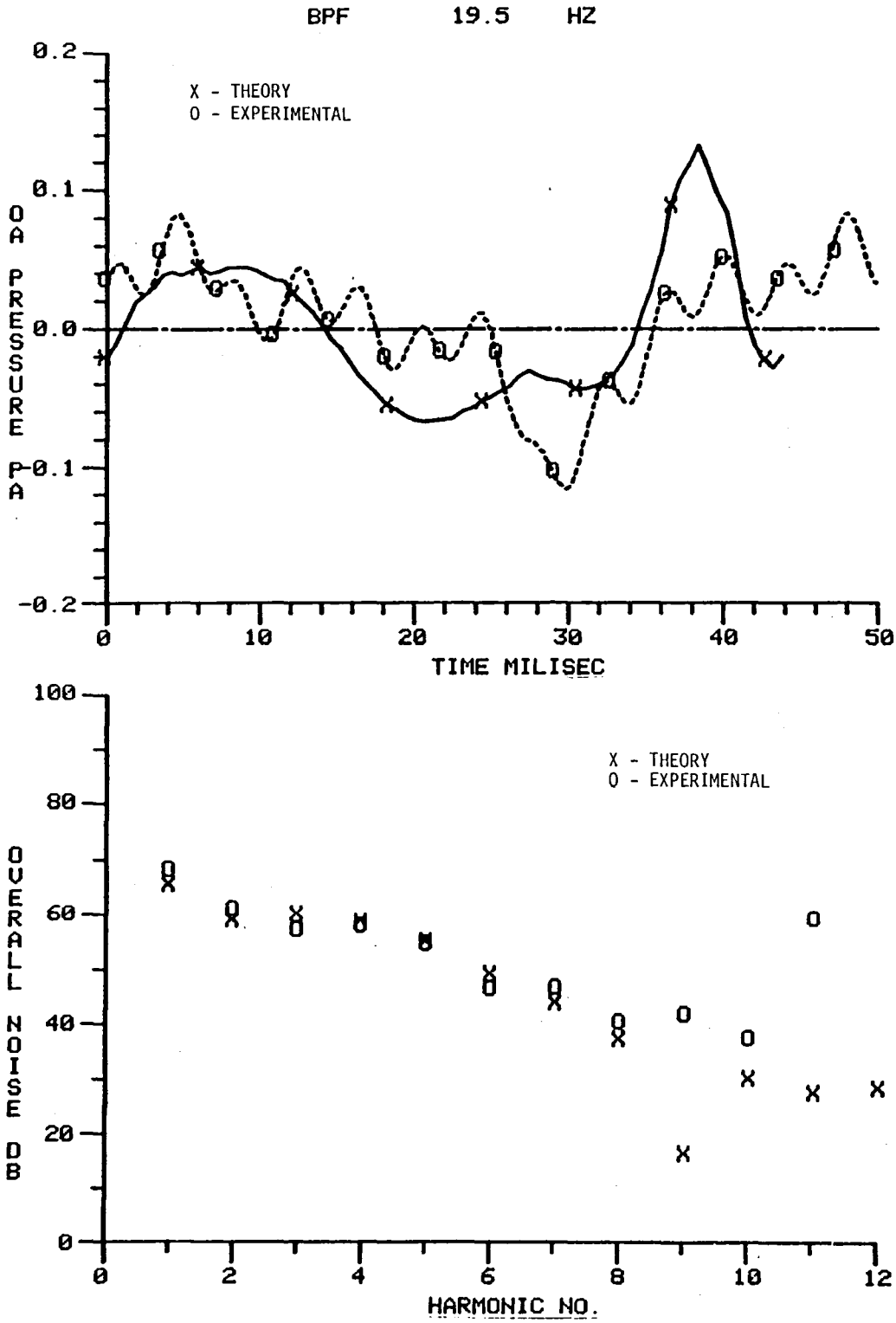


Figure 64. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

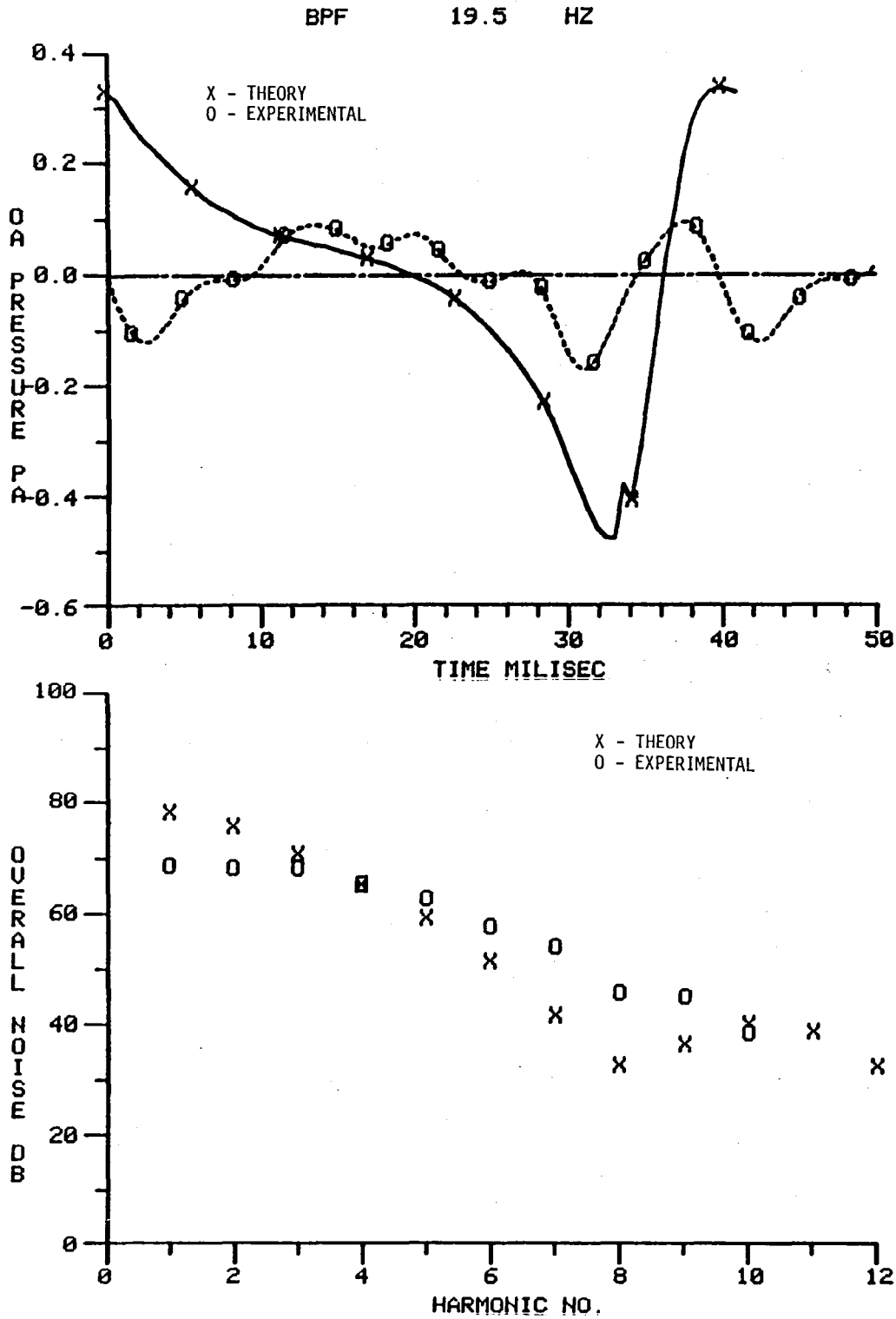


Figure 65. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 71.9m/sec (140 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, constant inflow model).

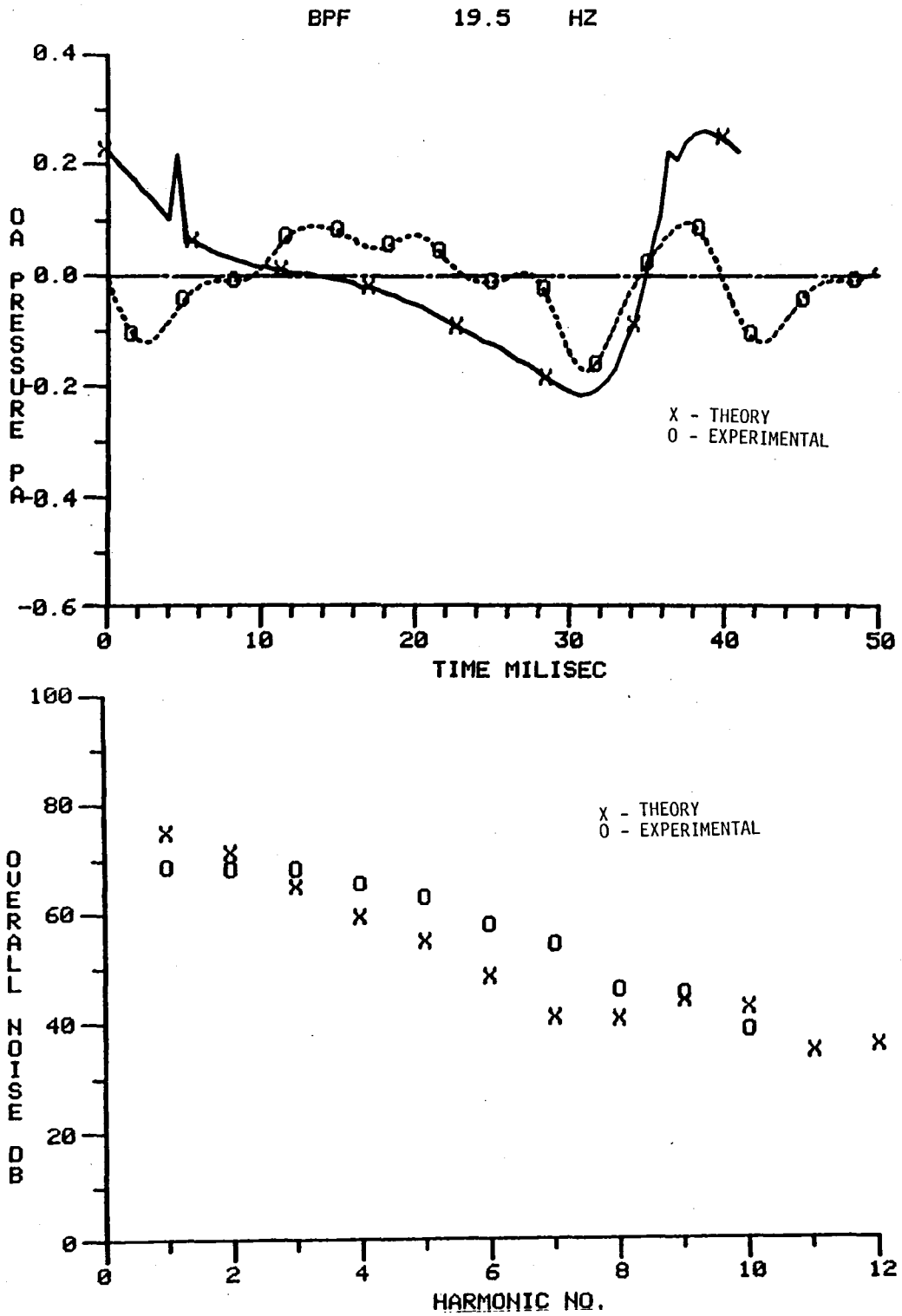


Figure 66. - Comparison of theoretical and experimental acoustic pressure signatures and spectra. V = 71.9m/sec (140 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter. Theoretical data calculated using predicted input airload (flexible blade, variable inflow model).

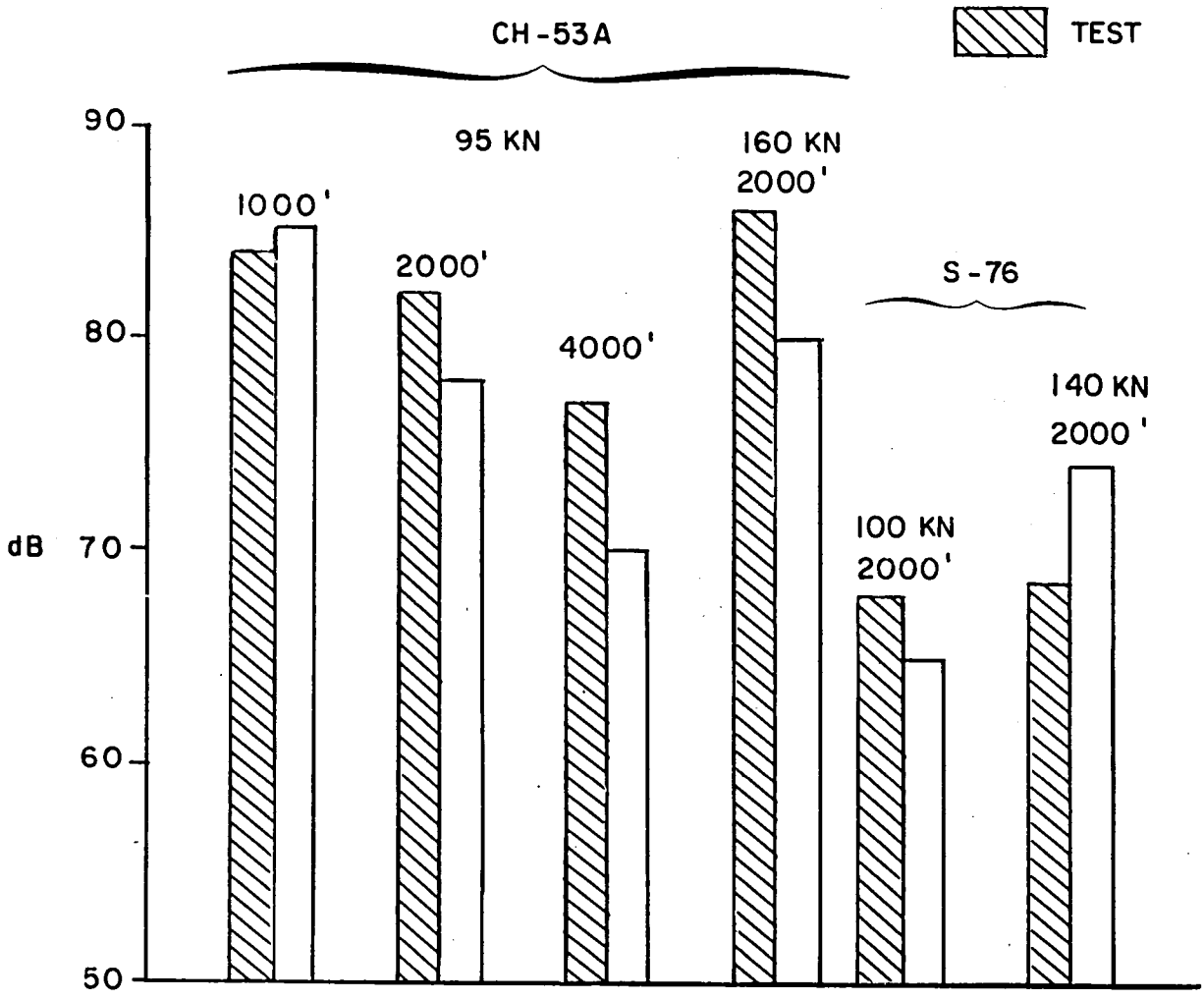


Figure 67. - 1st harmonic amplitude comparison summary.

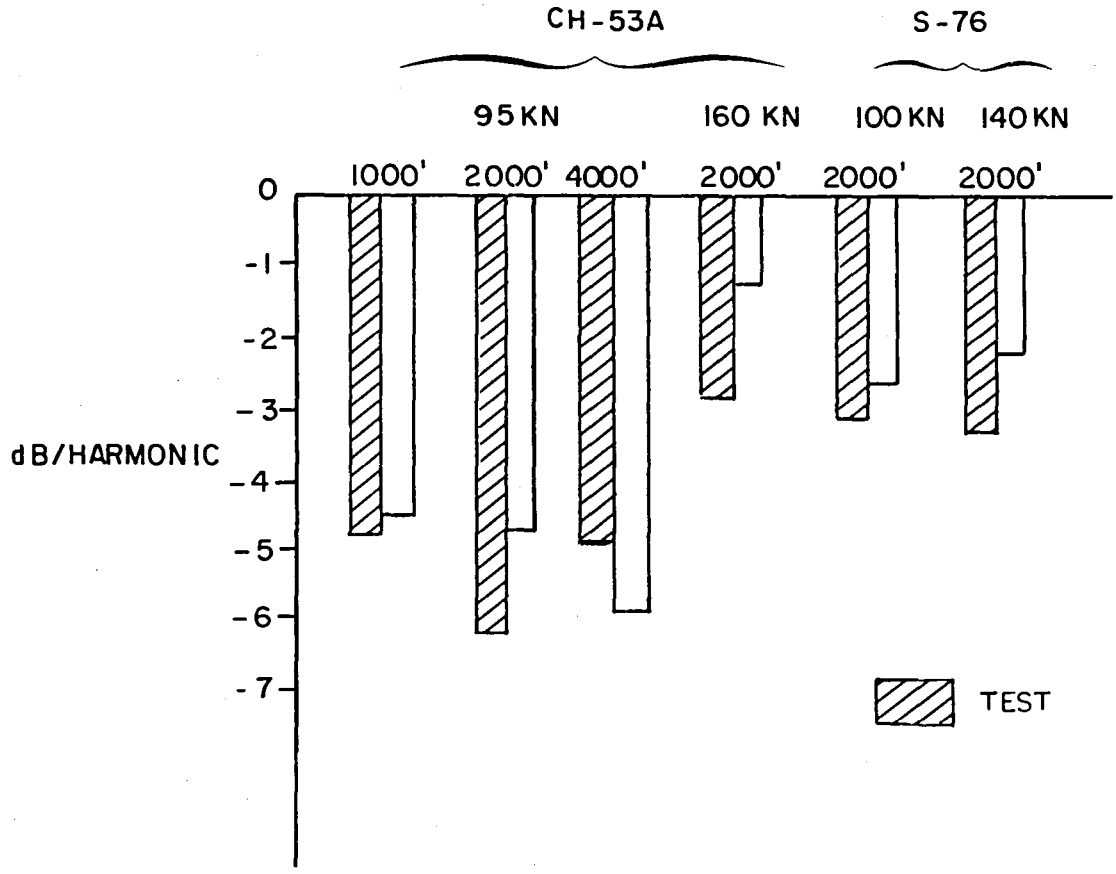


Figure 68. - Average harmonic amplitude reduction dB/harmonic.

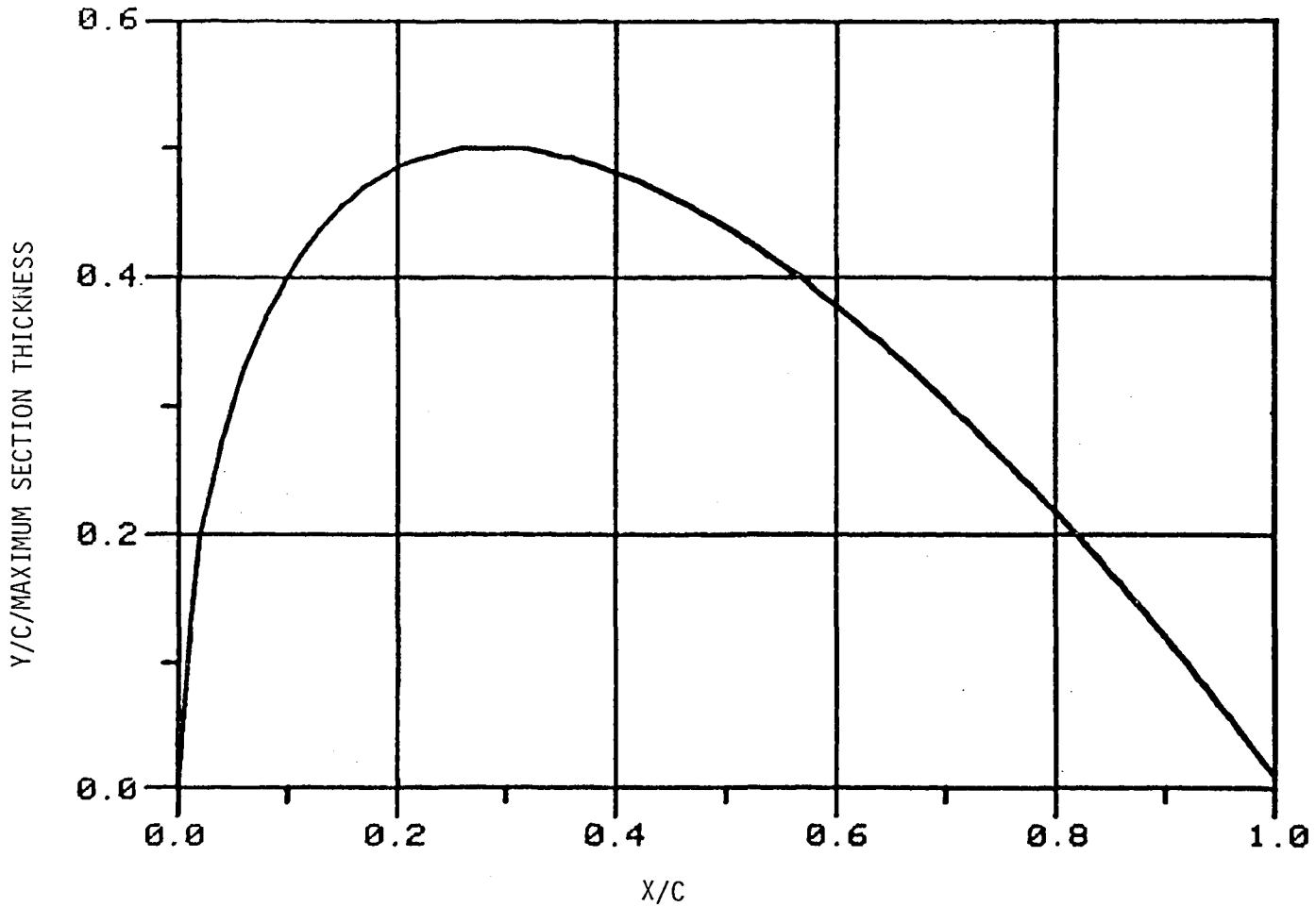


Figure A-1(a) - CH-53A main rotor characteristics. Normalized thickness distribution vs. nondimensional section chord.

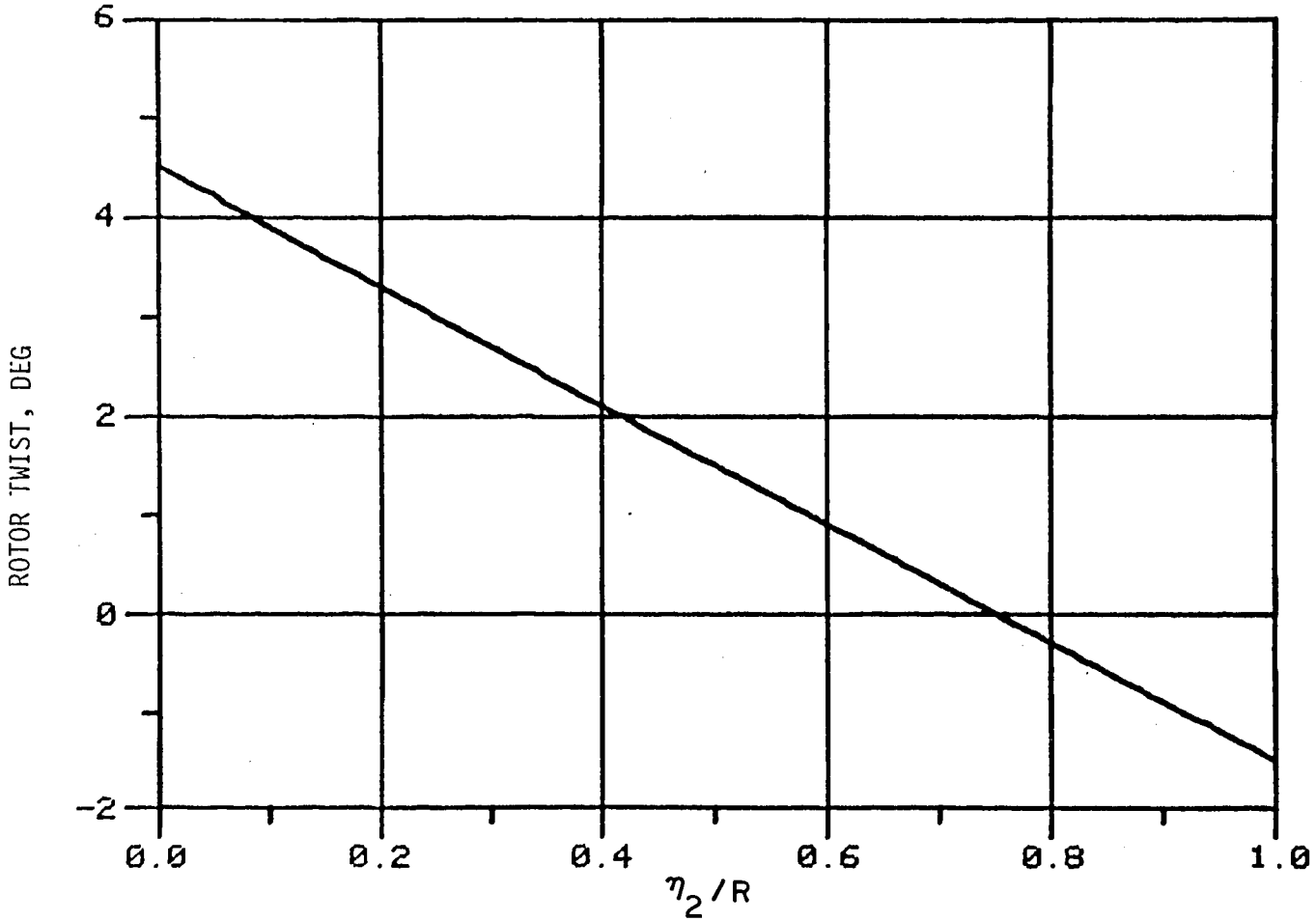


Figure A-1(b) - CH-53A main rotor characteristics. Blade twist vs. nondimensional rotor radius.

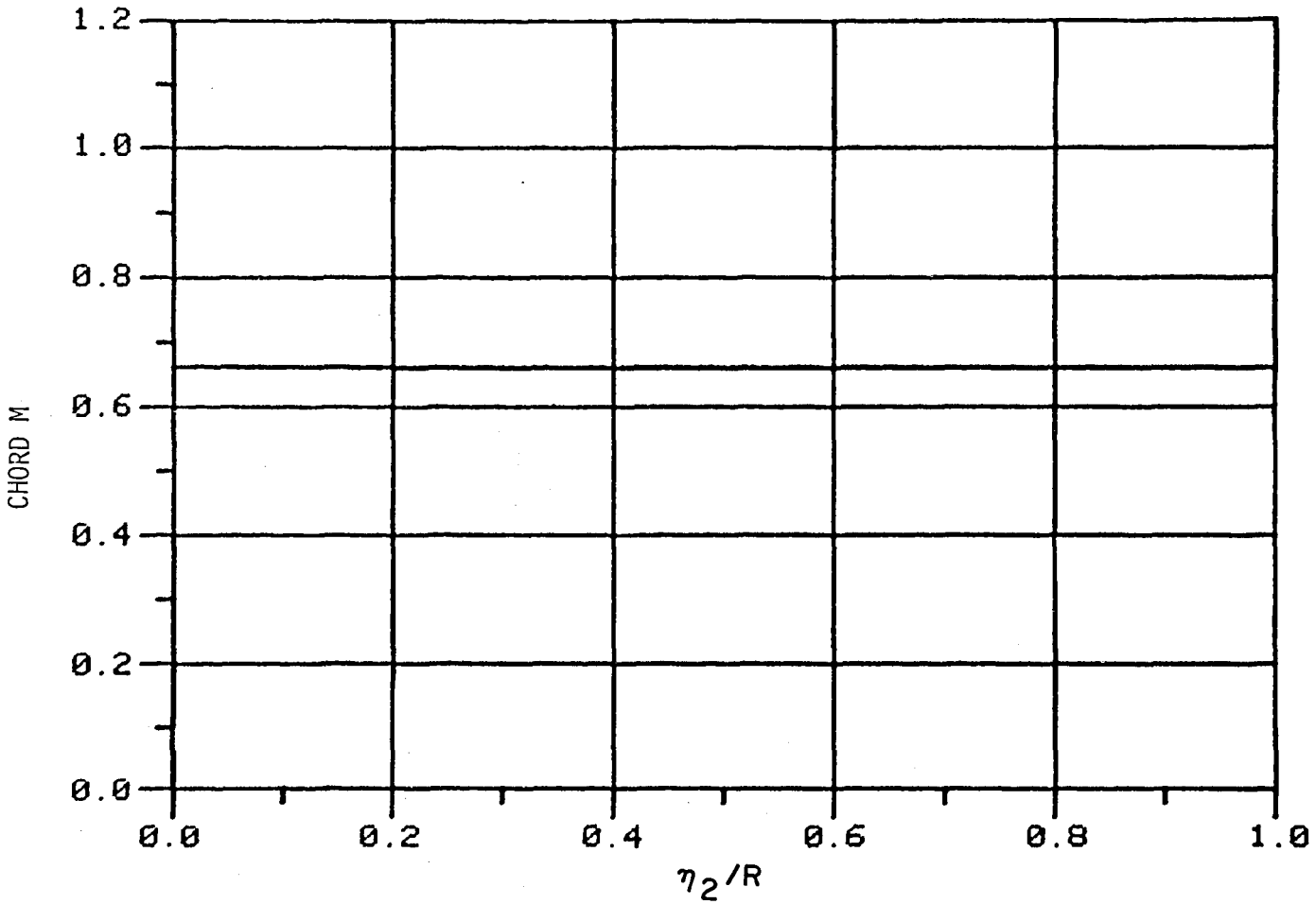


Figure A-1(c) - CH-53A main rotor characteristics. Chord vs. nondimensional rotor radius.

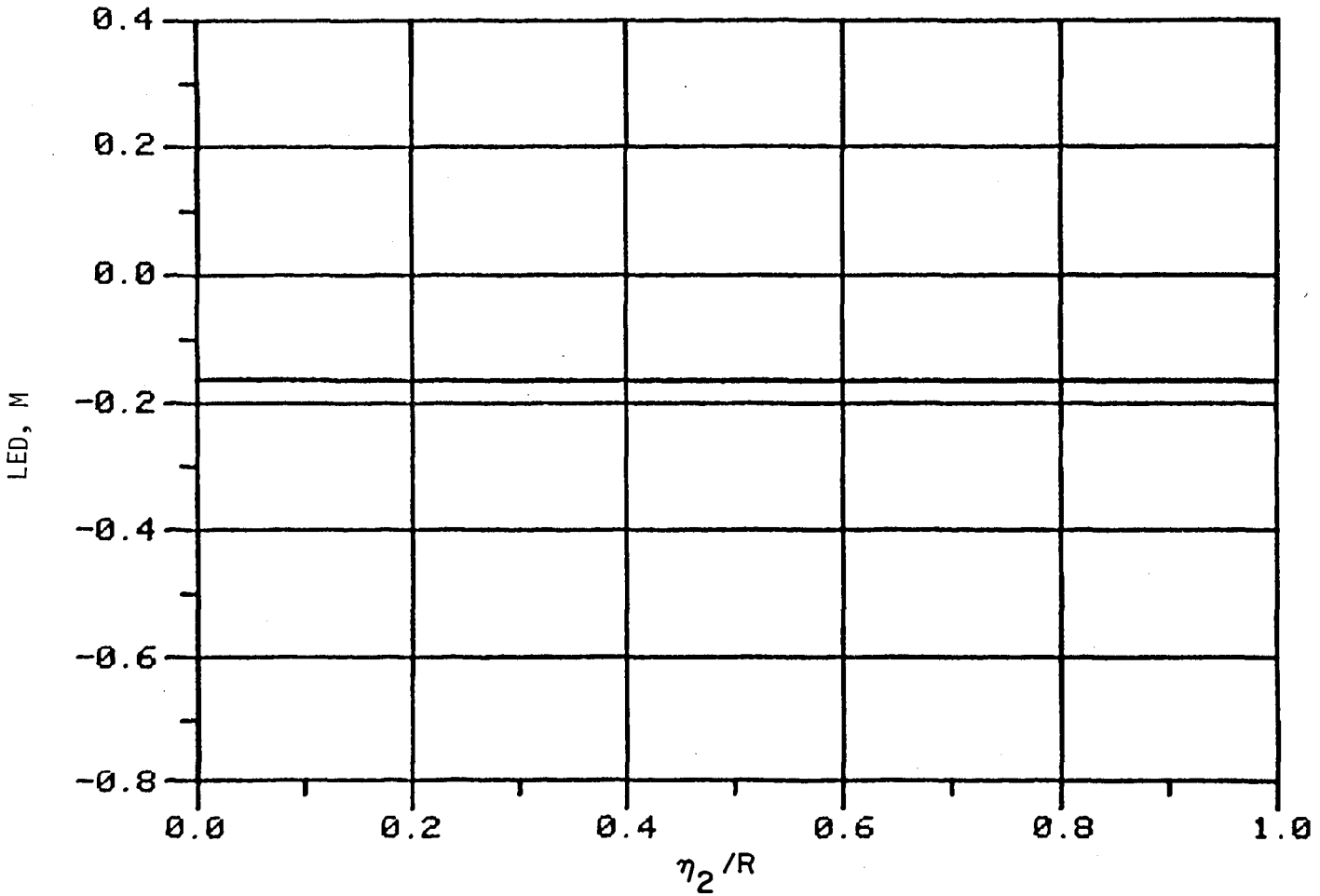


Figure A-1(d) - CH-53A main rotor characteristics. Leading edge displacement vs. nondimensional rotor radius.

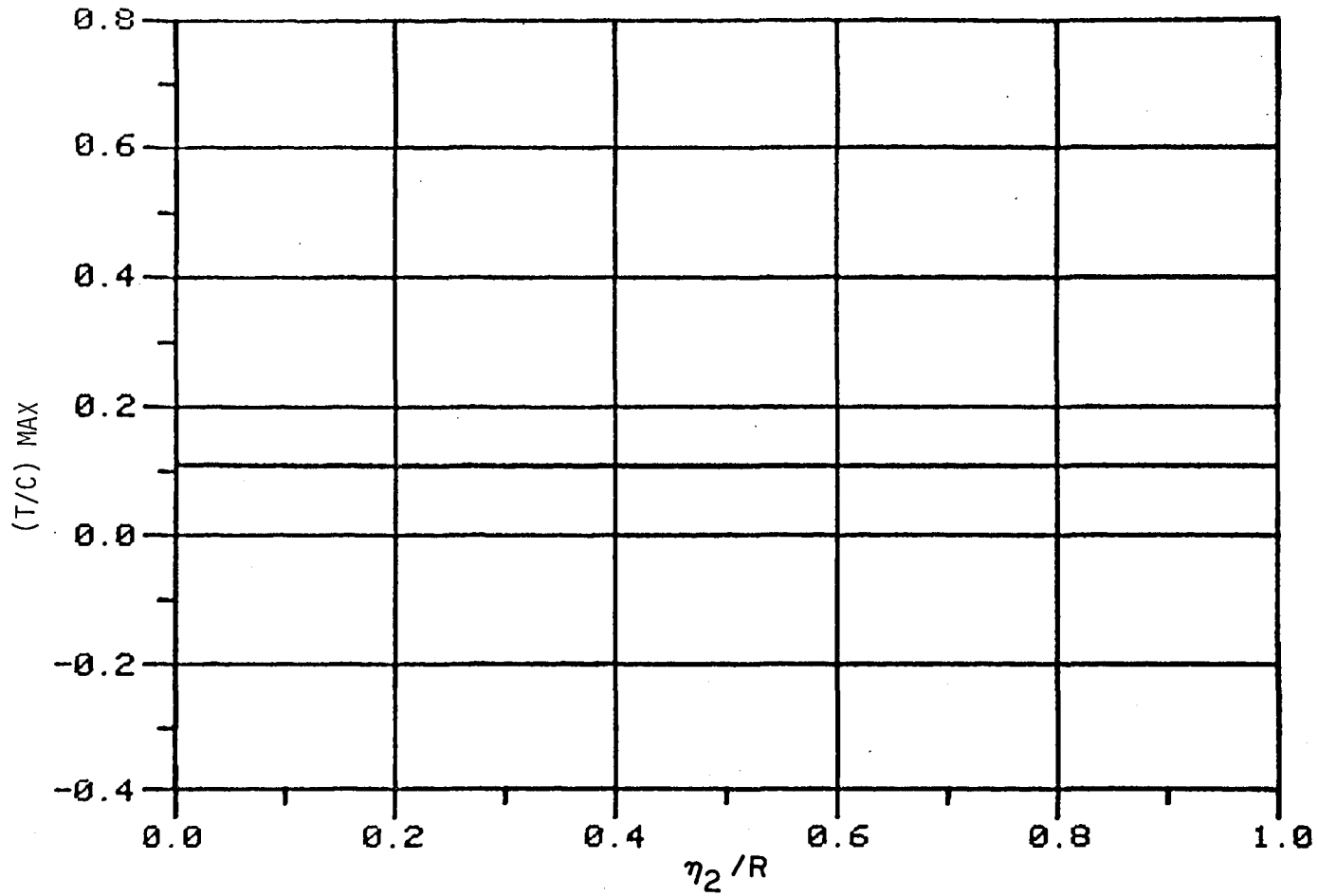


Figure A-1(e) - CH-53A main rotor characteristics. Rotor maximum thickness/chord ratio vs nondimensional rotor radius.

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-2,24,.1067,.1067
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Figure A-1(f) - Farassat/Nystrom analysis rotor characteristics and operating conditions input data for CH-53A main rotor.

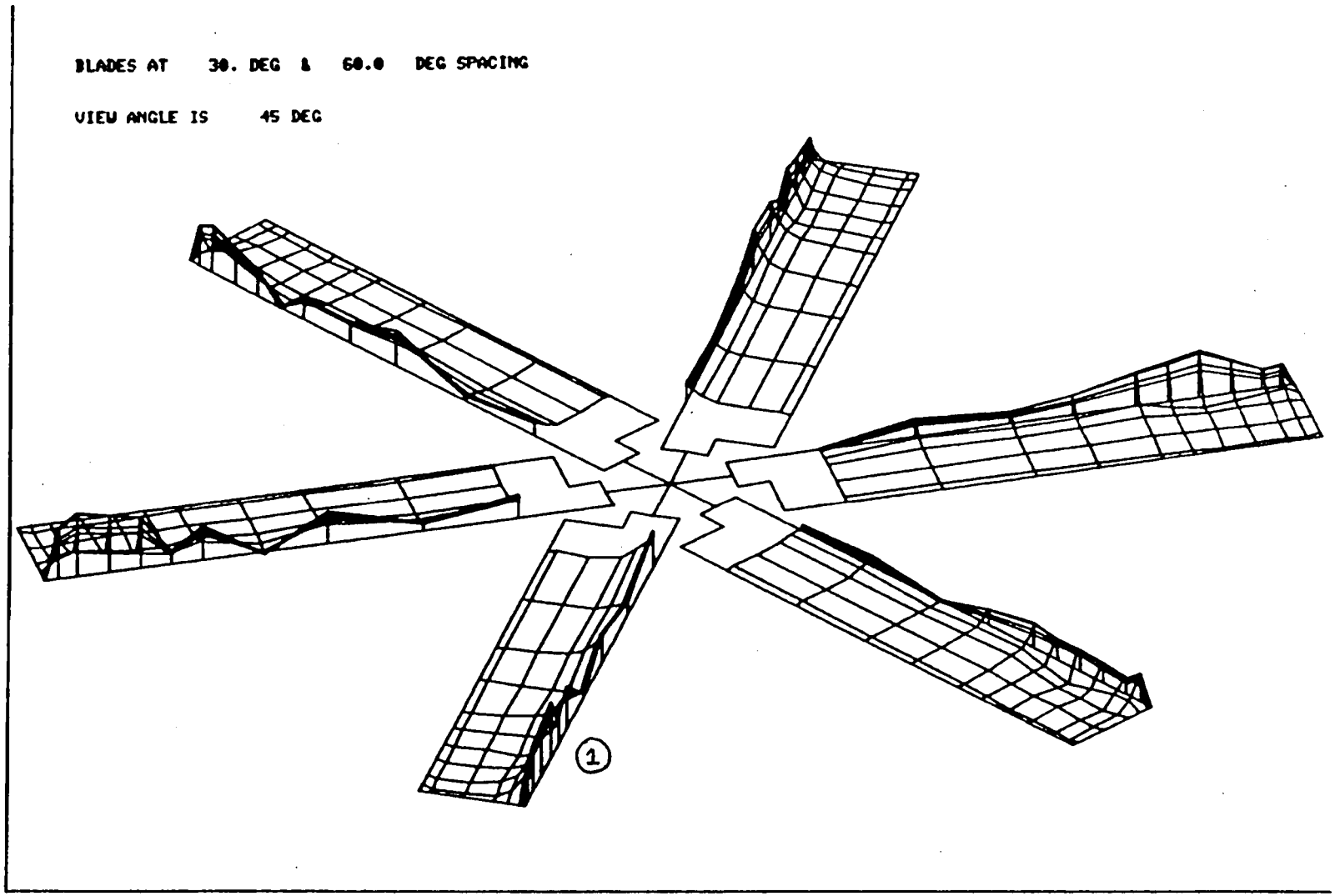

Figure A-2(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 30° azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

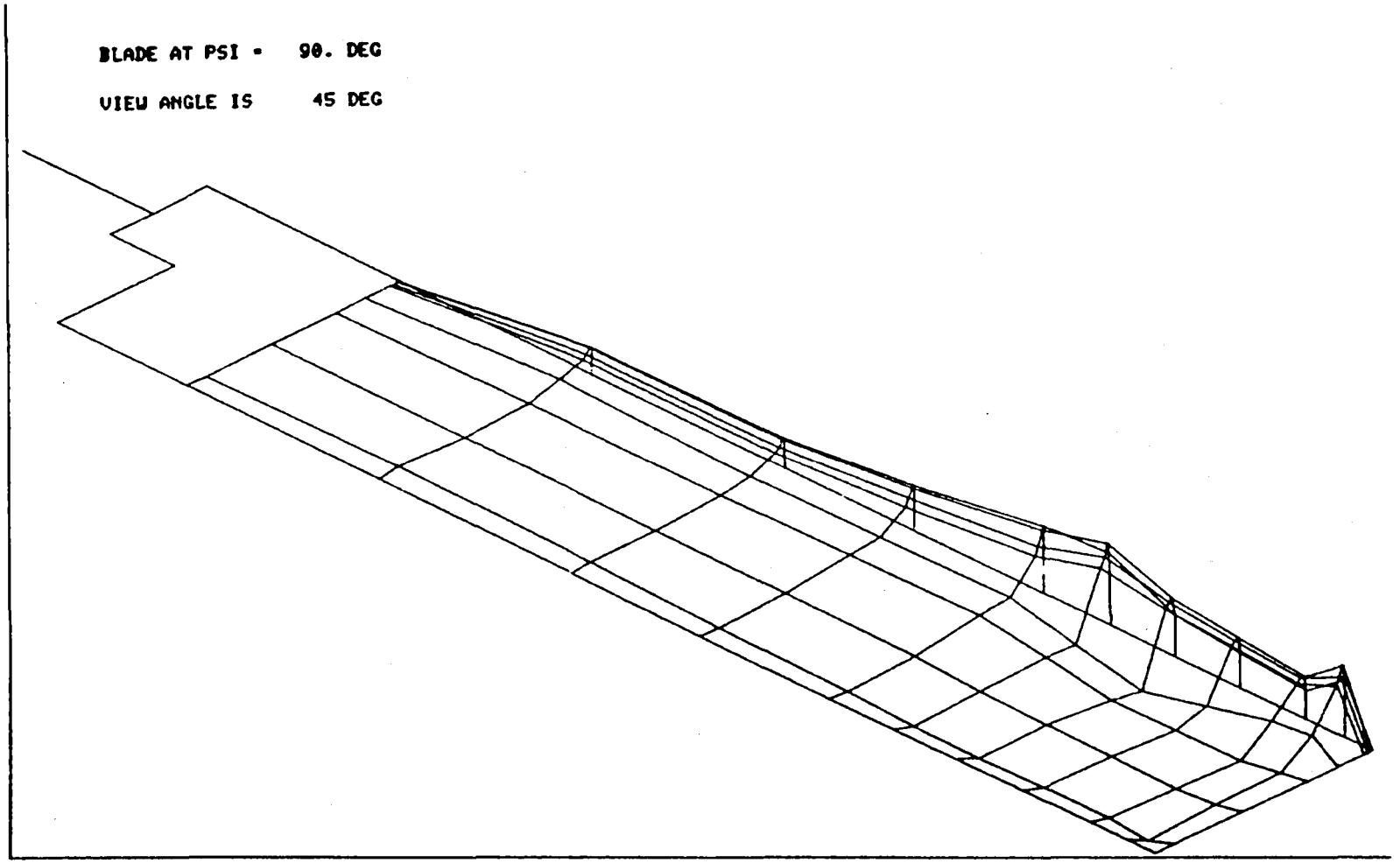

Figure A-2(b) - Isometric plot - spanwise and chordwise loading on blade positioned at 90^0 azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

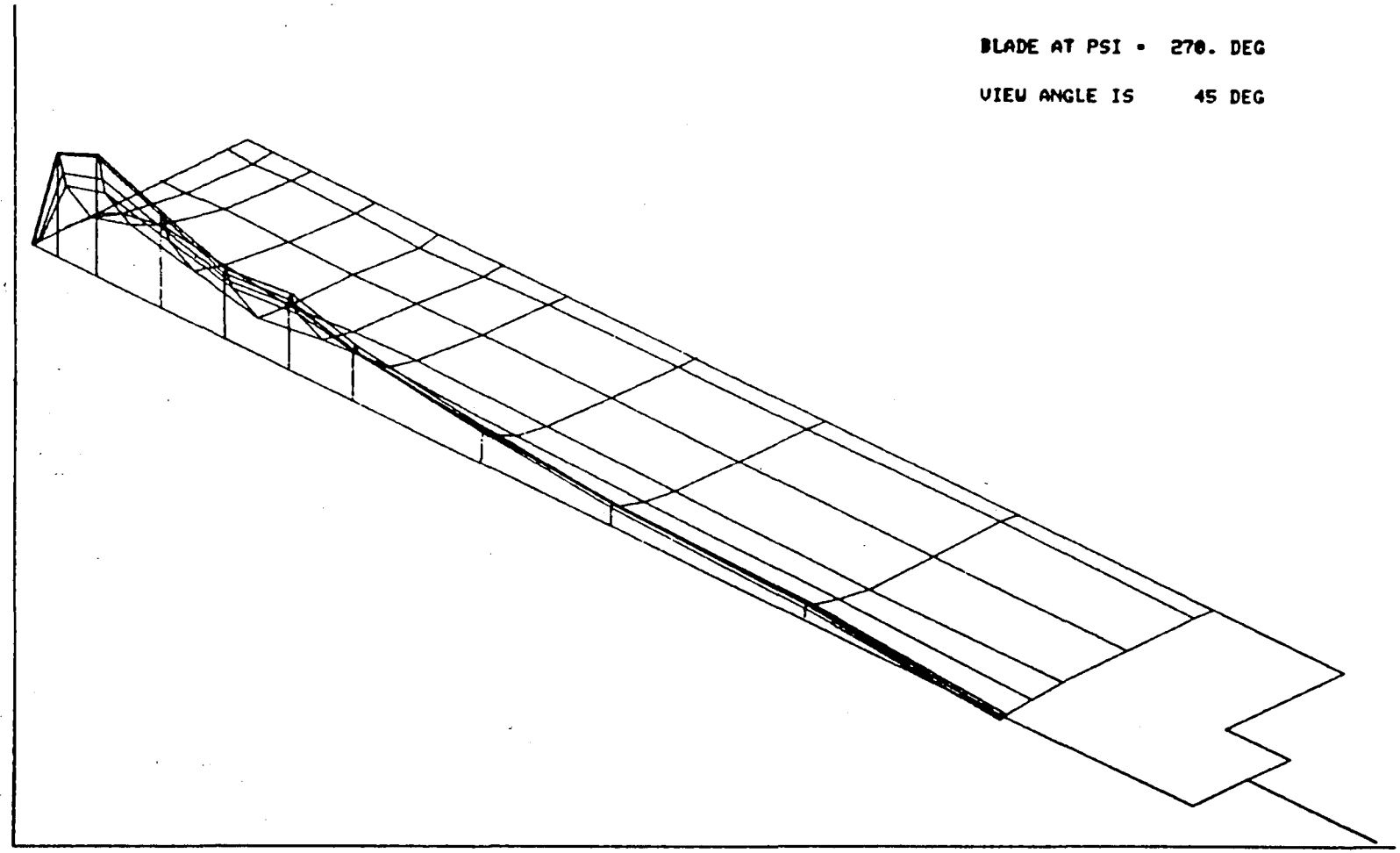

Figure A-2(c) - Isometric plot - spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

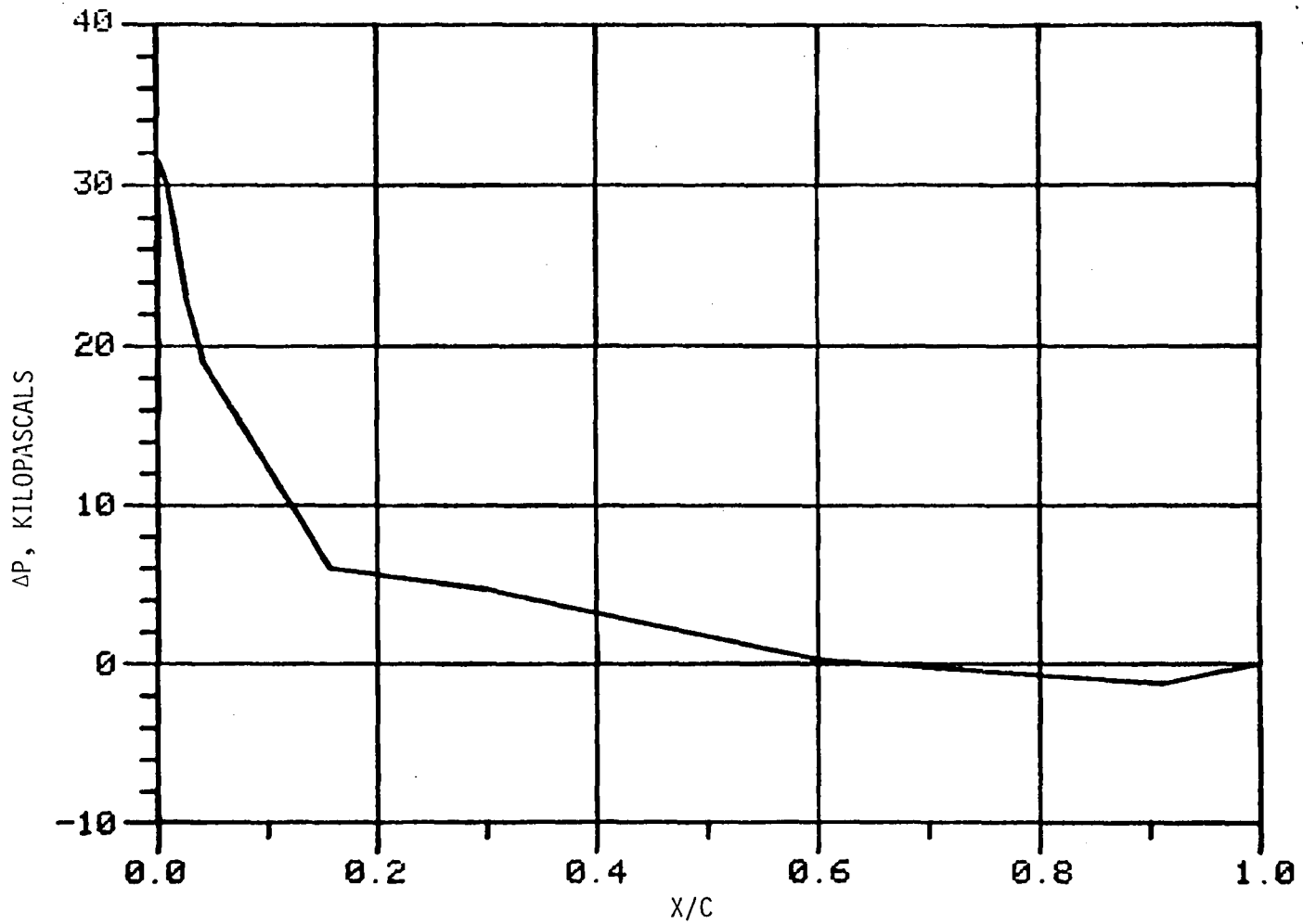

Figure A-2(d) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 48.9 in/sec (95 kt). r/R = 0.75 Predicted input airload data.

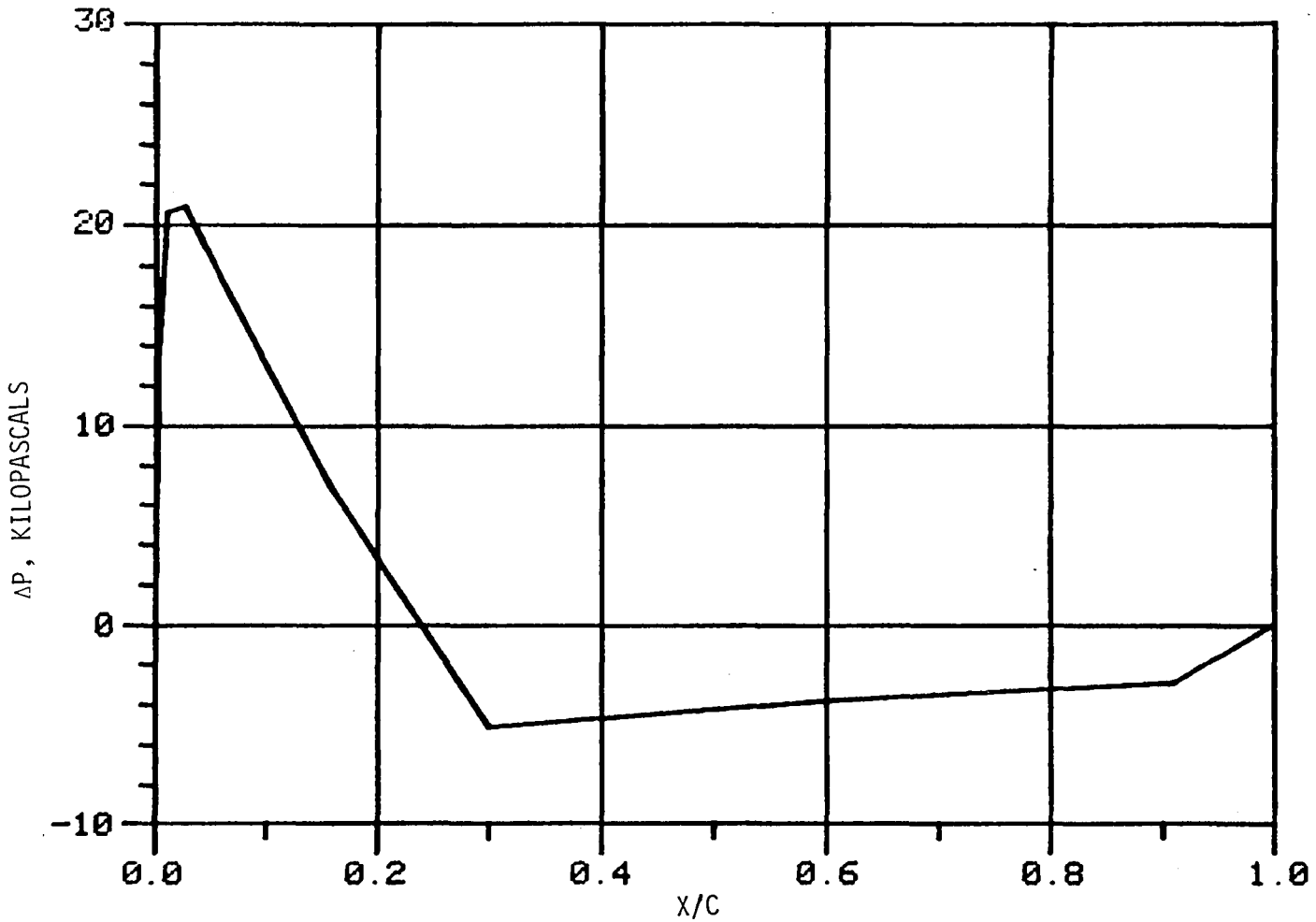

Figure A-2(e) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.95 Predicted input airload data.

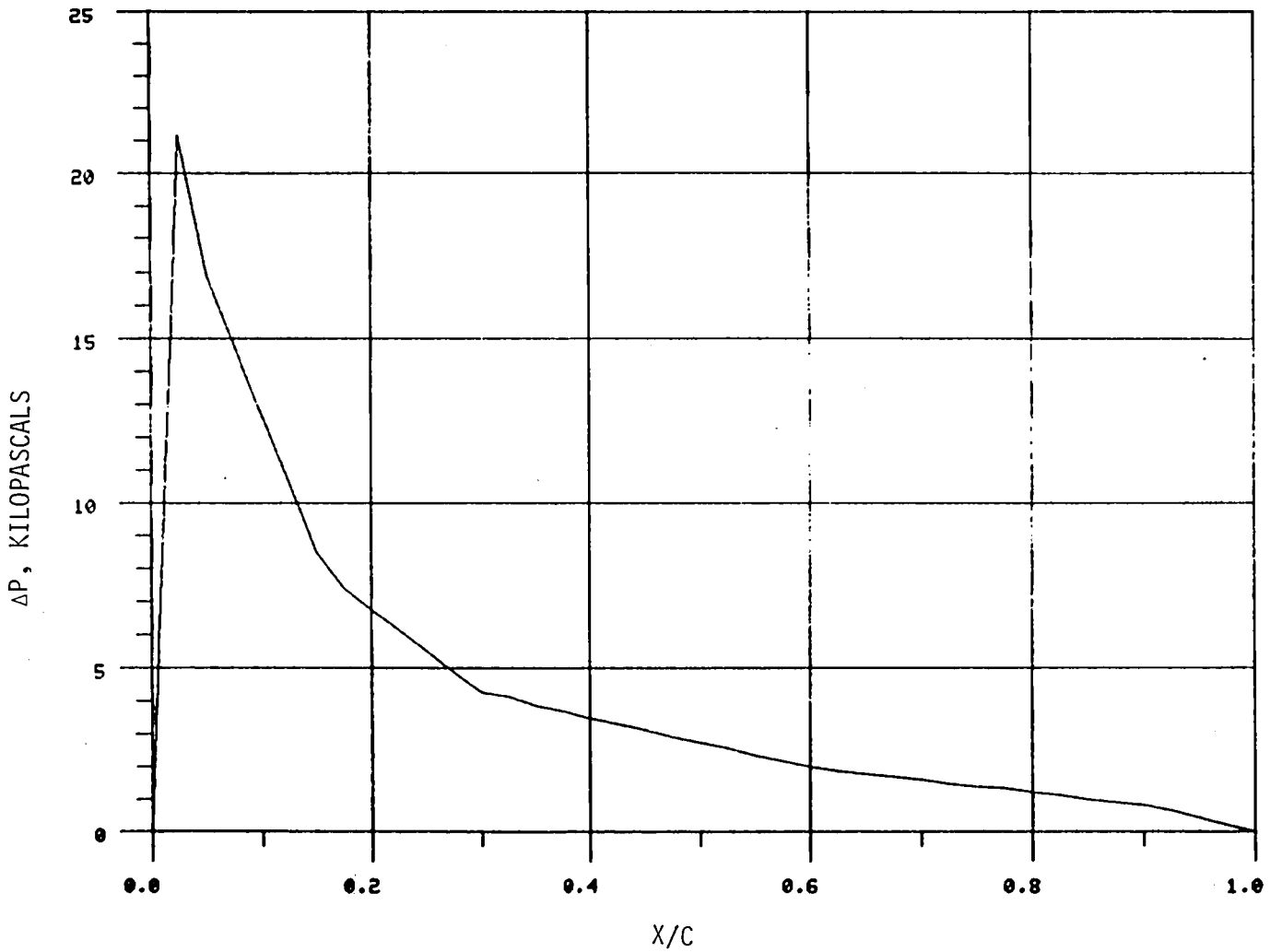

Figure A-2(f) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.75 Predictedinput airload data.

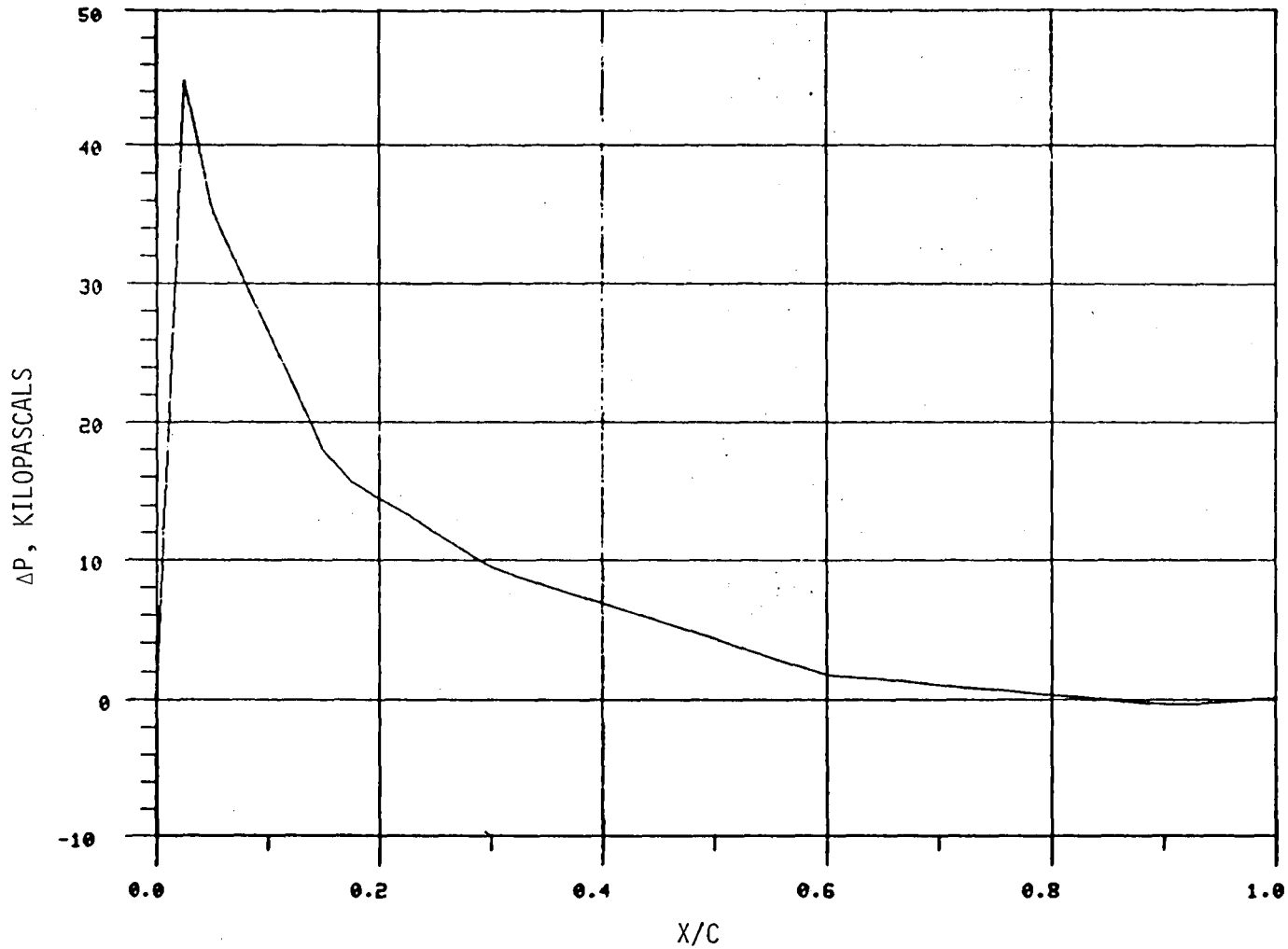

Figure A-2(g) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.95 Predicted input airload data.

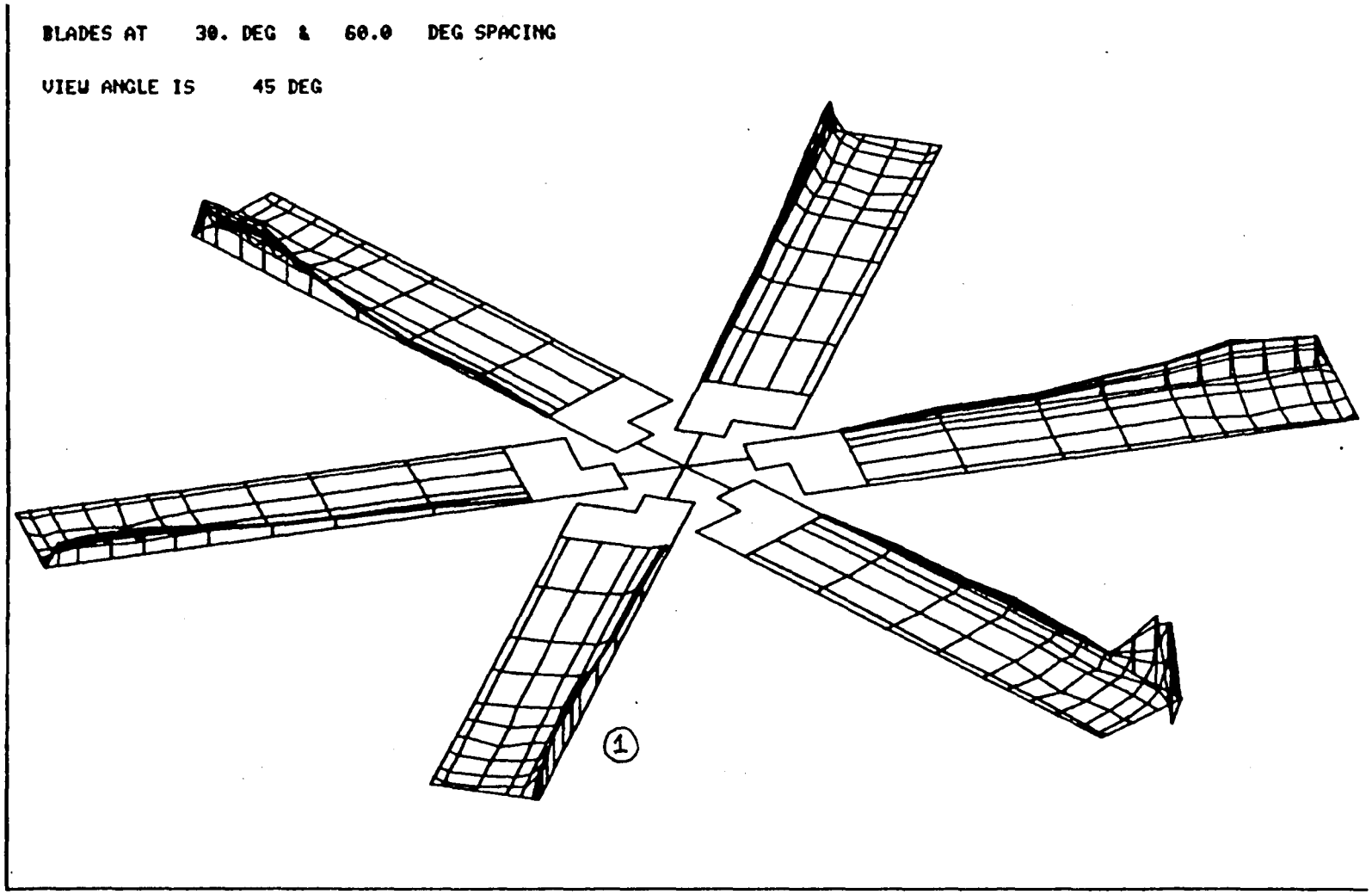

Figure A-3(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 30^{0} azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

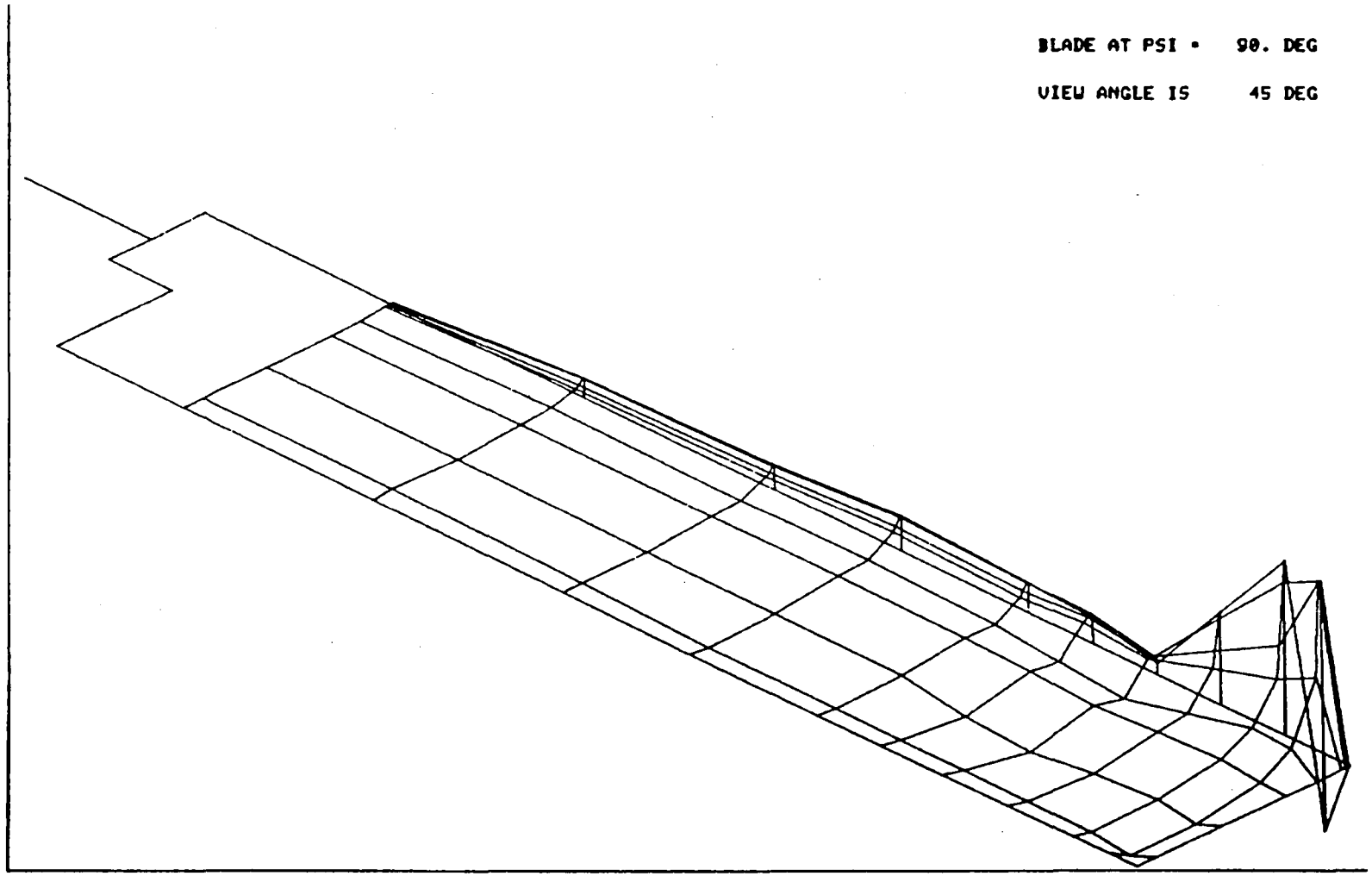

Figure A-3(b) - Isometric plot - spanwise and chordwise loading on blade positioned at 90^{0} azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

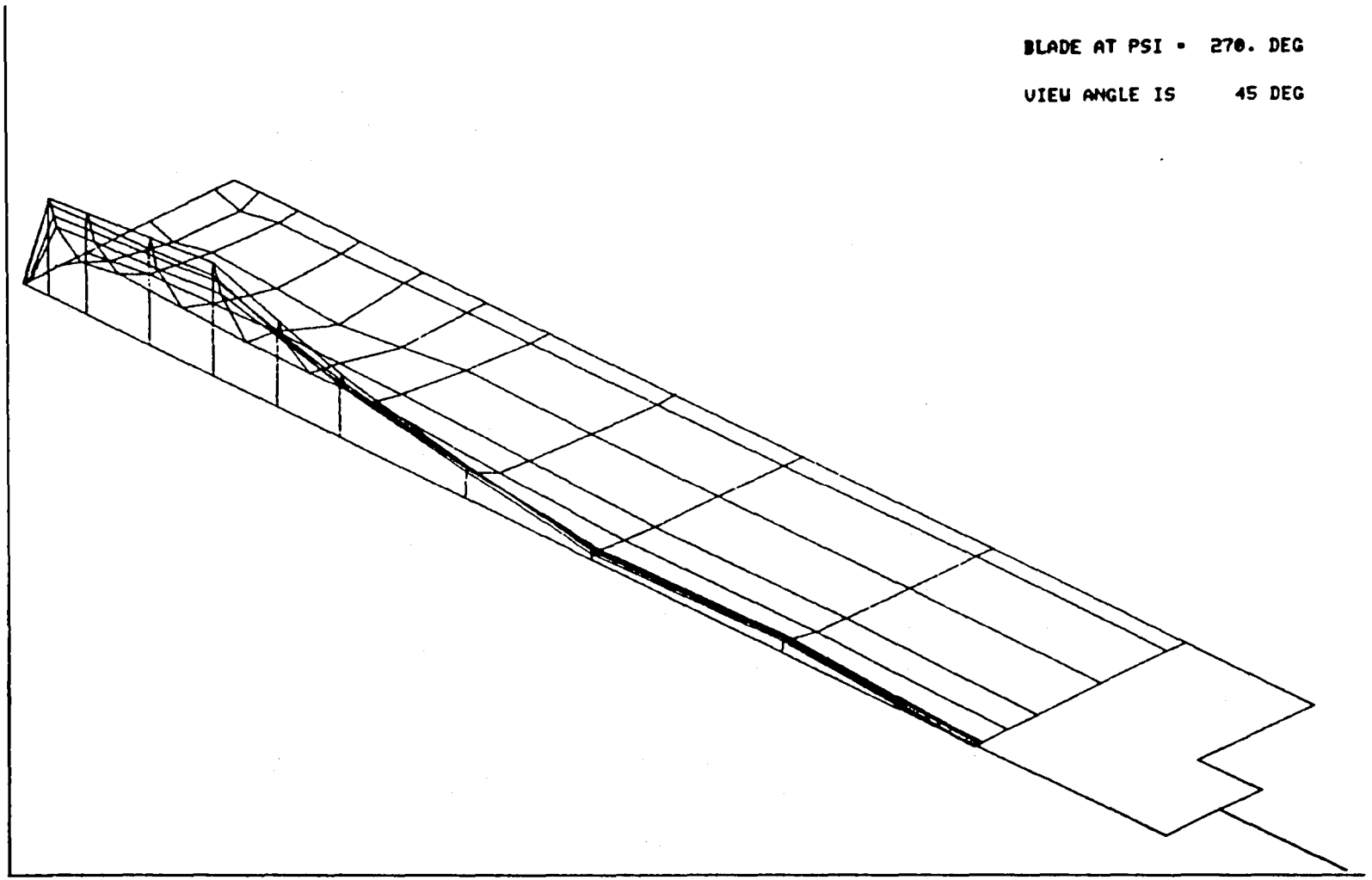

Figure A-3(c) - Isometric plot - spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

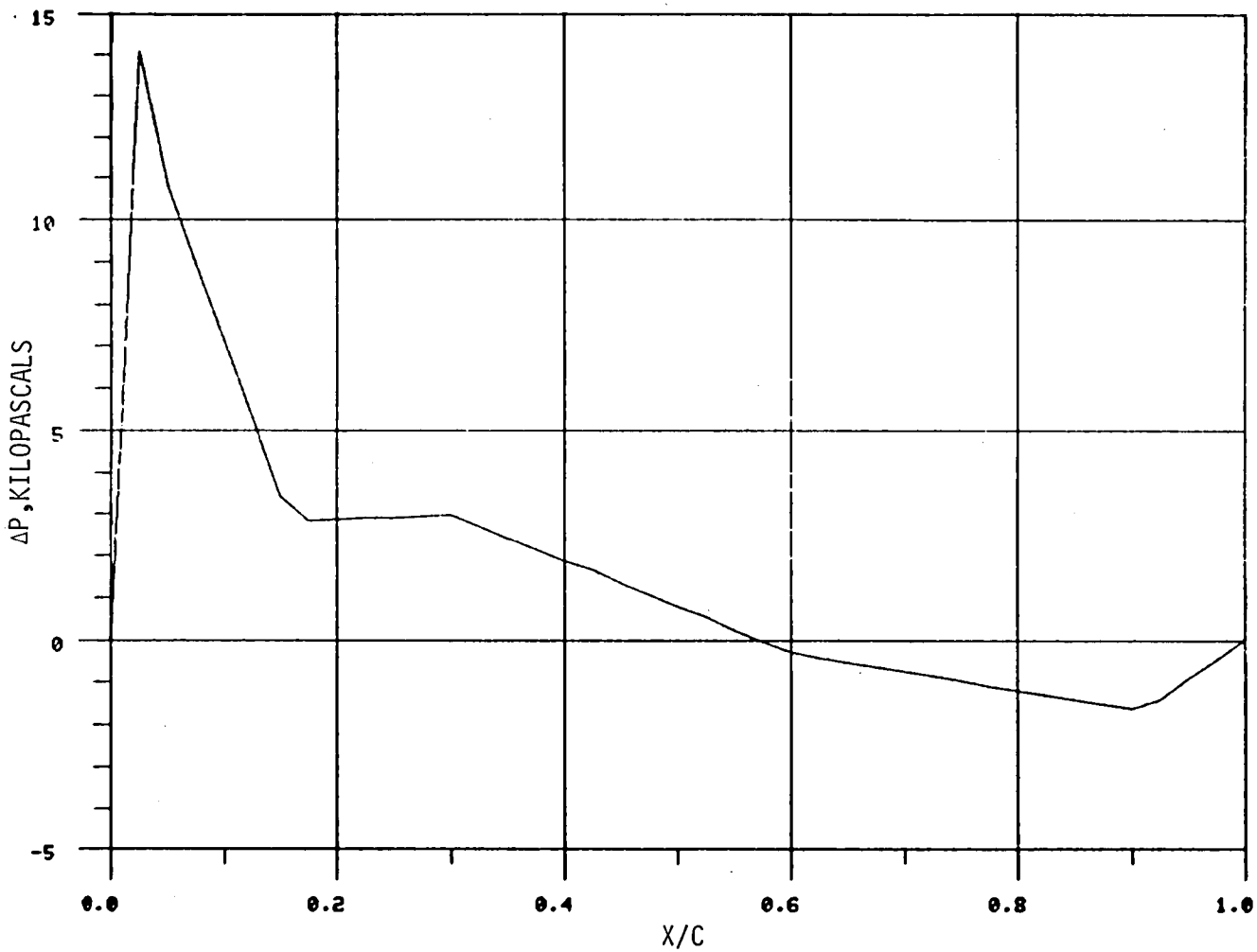

Figure A-3(d) - Chordwise pressure distribution. Blade positioned at 90^{0} azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.75. Predicted input airload data.

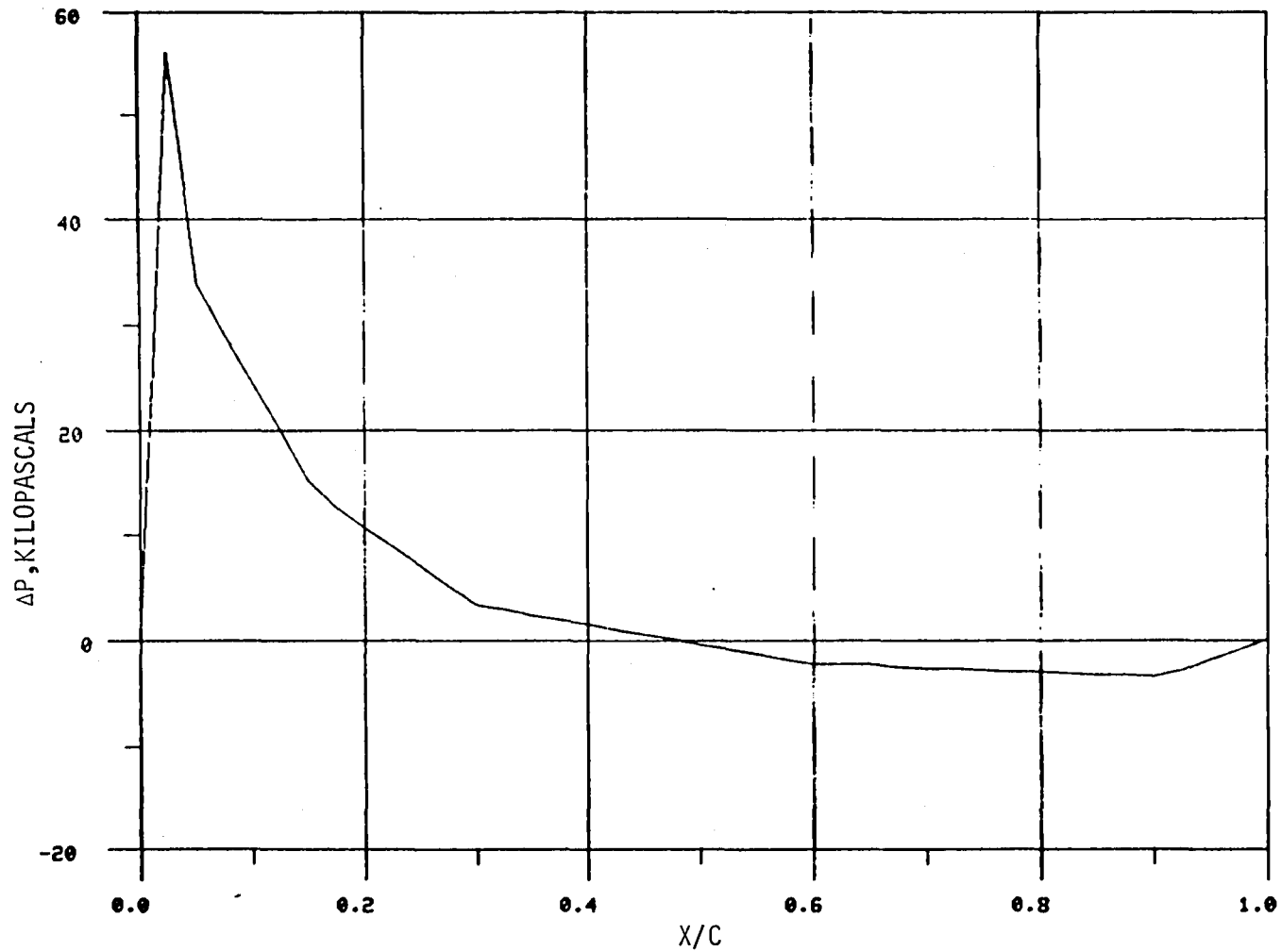

Figure A-3(e) - Chordwise pressure distribution. Blade positioned at 90^0 azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.95. Predicted input airload data.

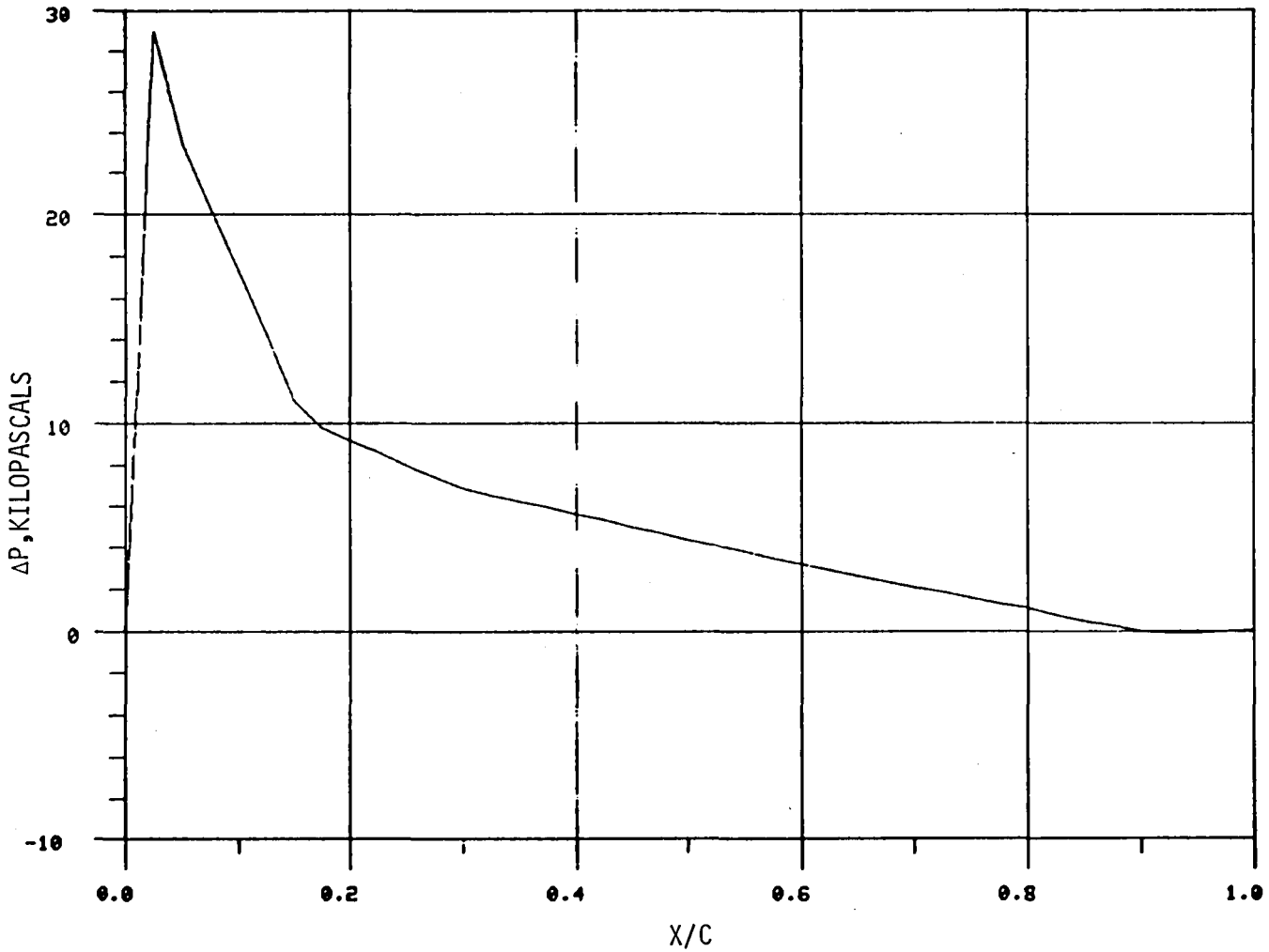

Figure A-3(f) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.75. Predicted input airload data.

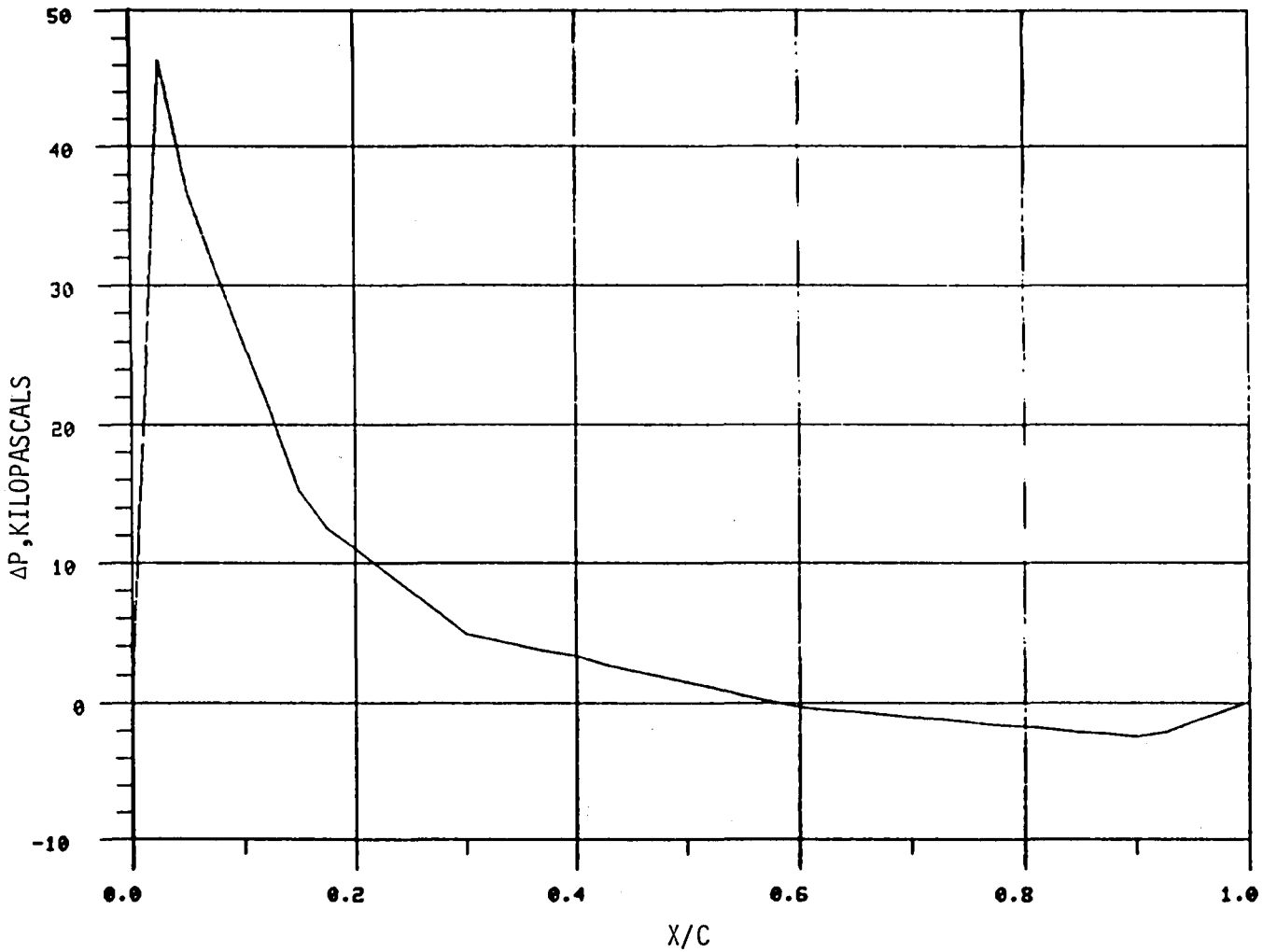

Figure A-3(g) - Chordwise pressure distribution. Blade positioned at 270^{0} azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.95. Predicted input airload data.

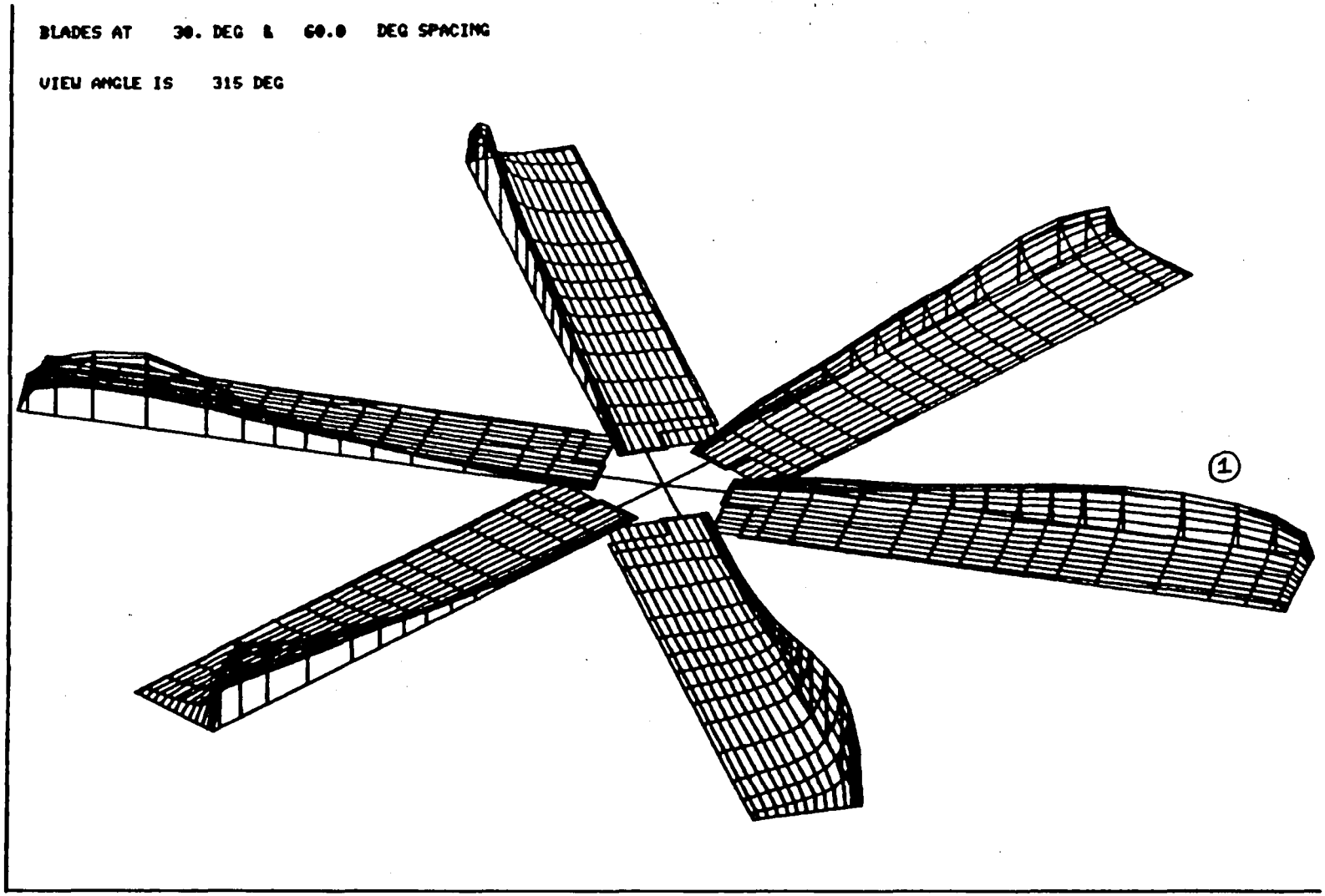

Figure A-4(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 30^0 azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

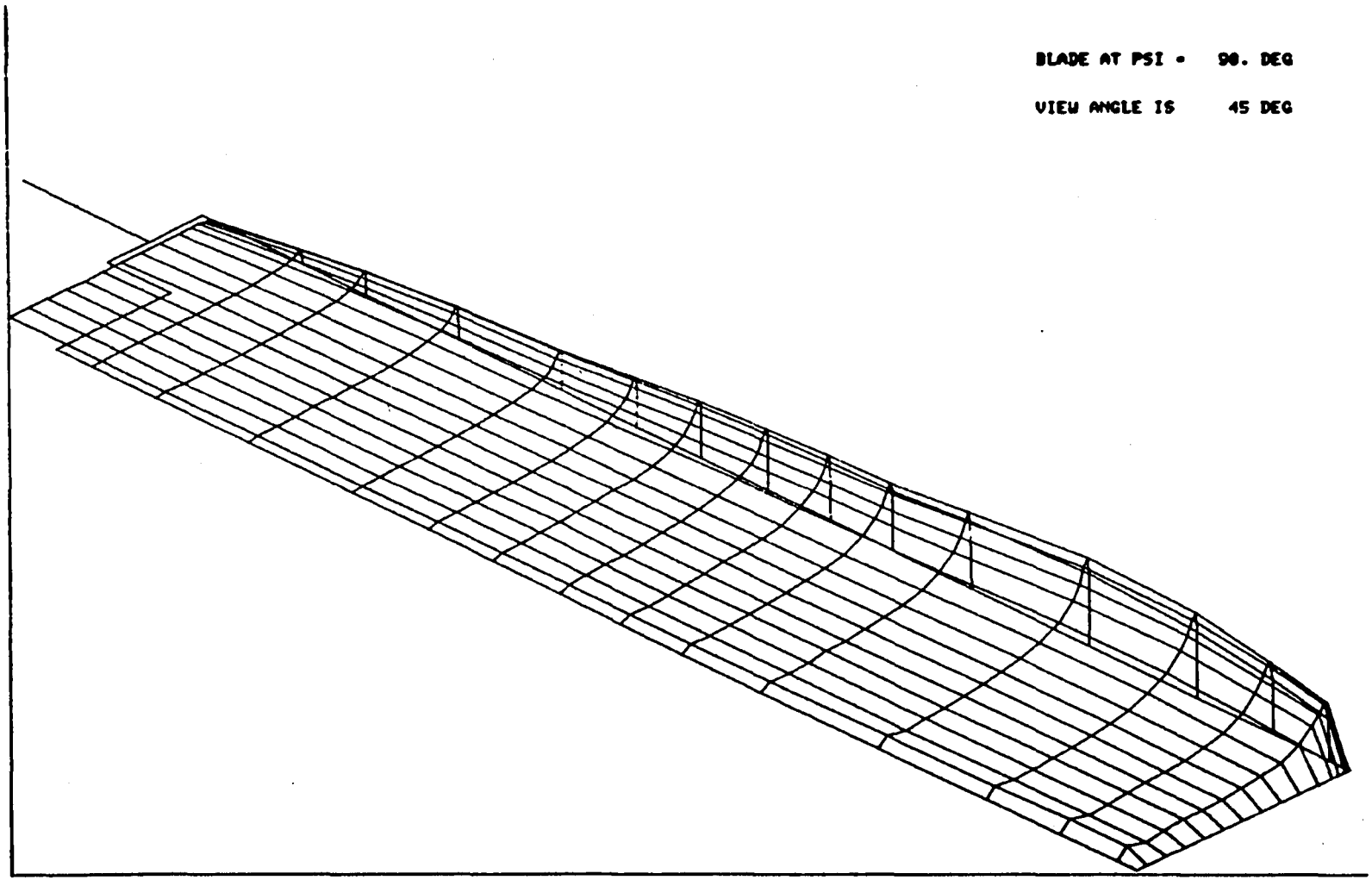

Figure A-4(b) - Isometric plot - spanwise and chordwise loading on blade positioned at 90° azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

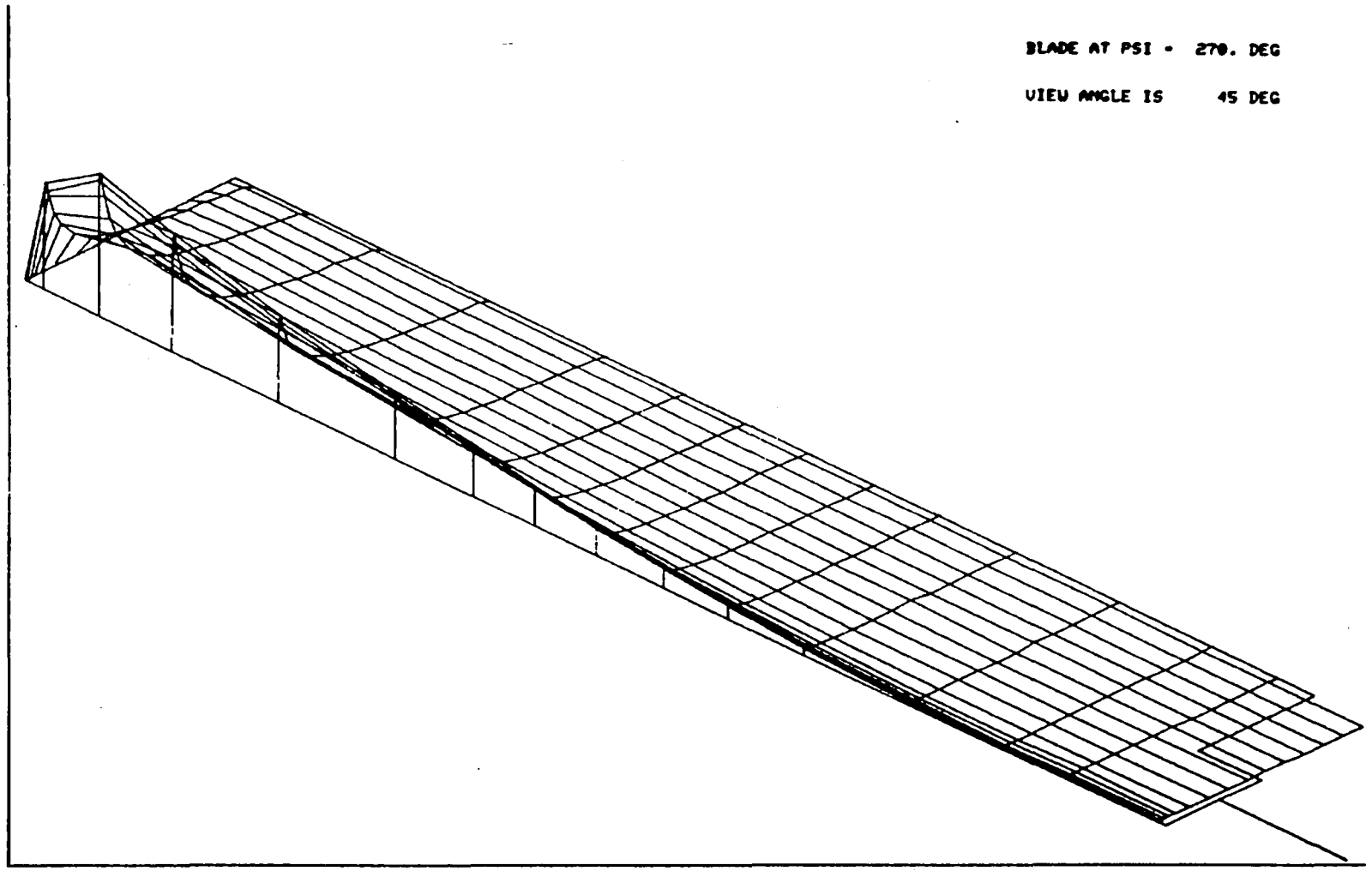

Figure A-4(c) - Isometric plot - spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). Predicted input airload data.

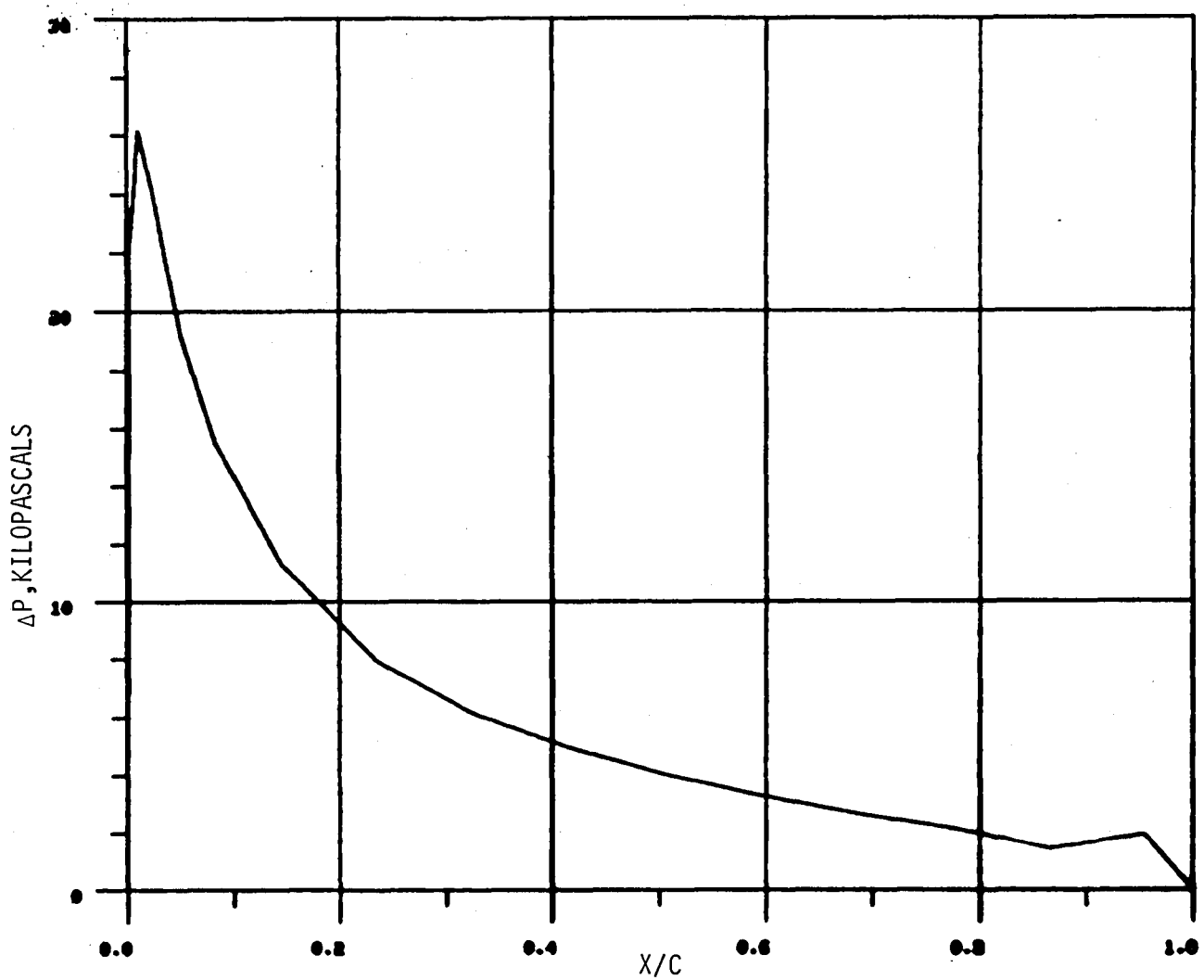

Figure A-4(d) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.75. Predicted input airload data.

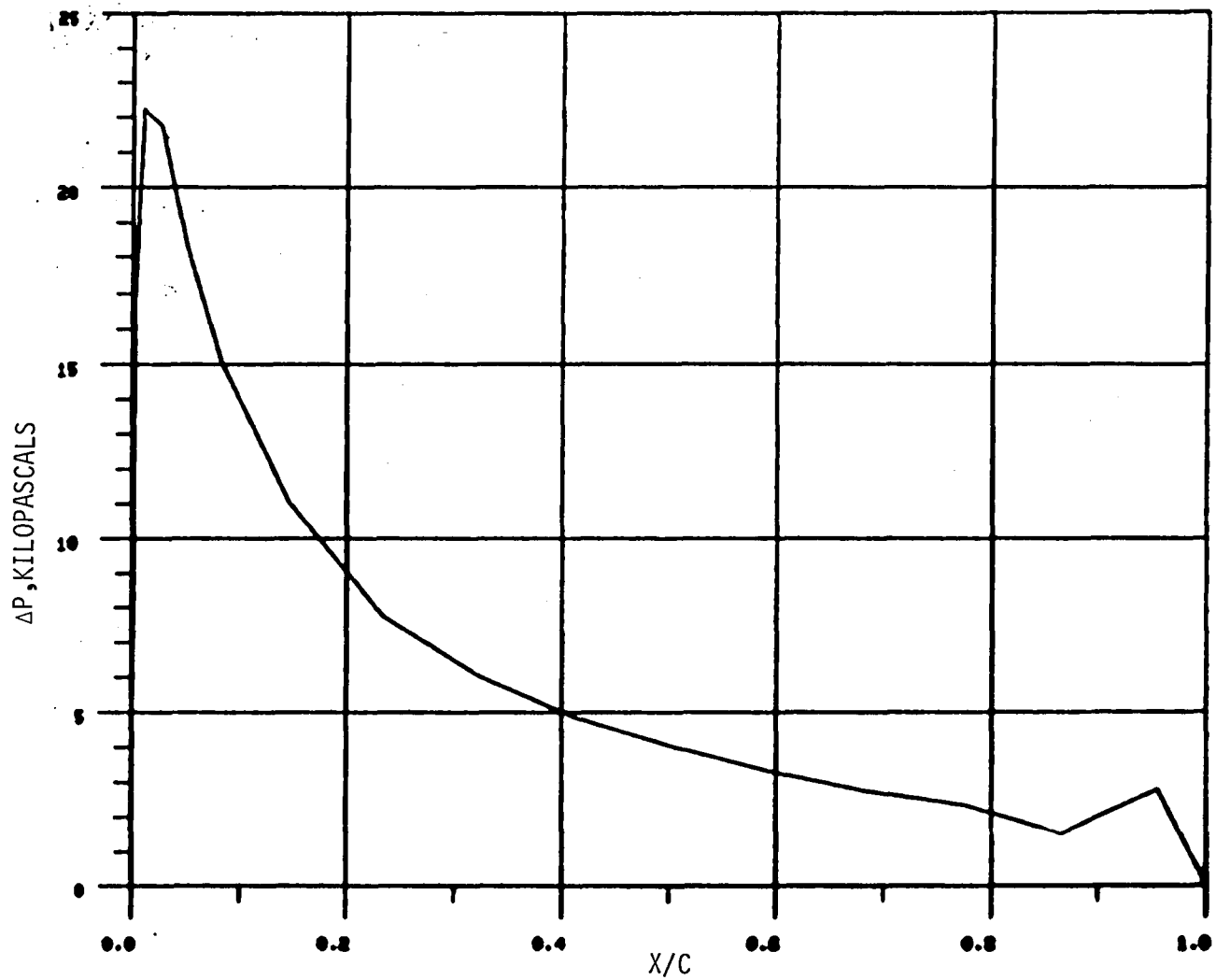

Figure A-4(e) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.95. Predicted input airload data.

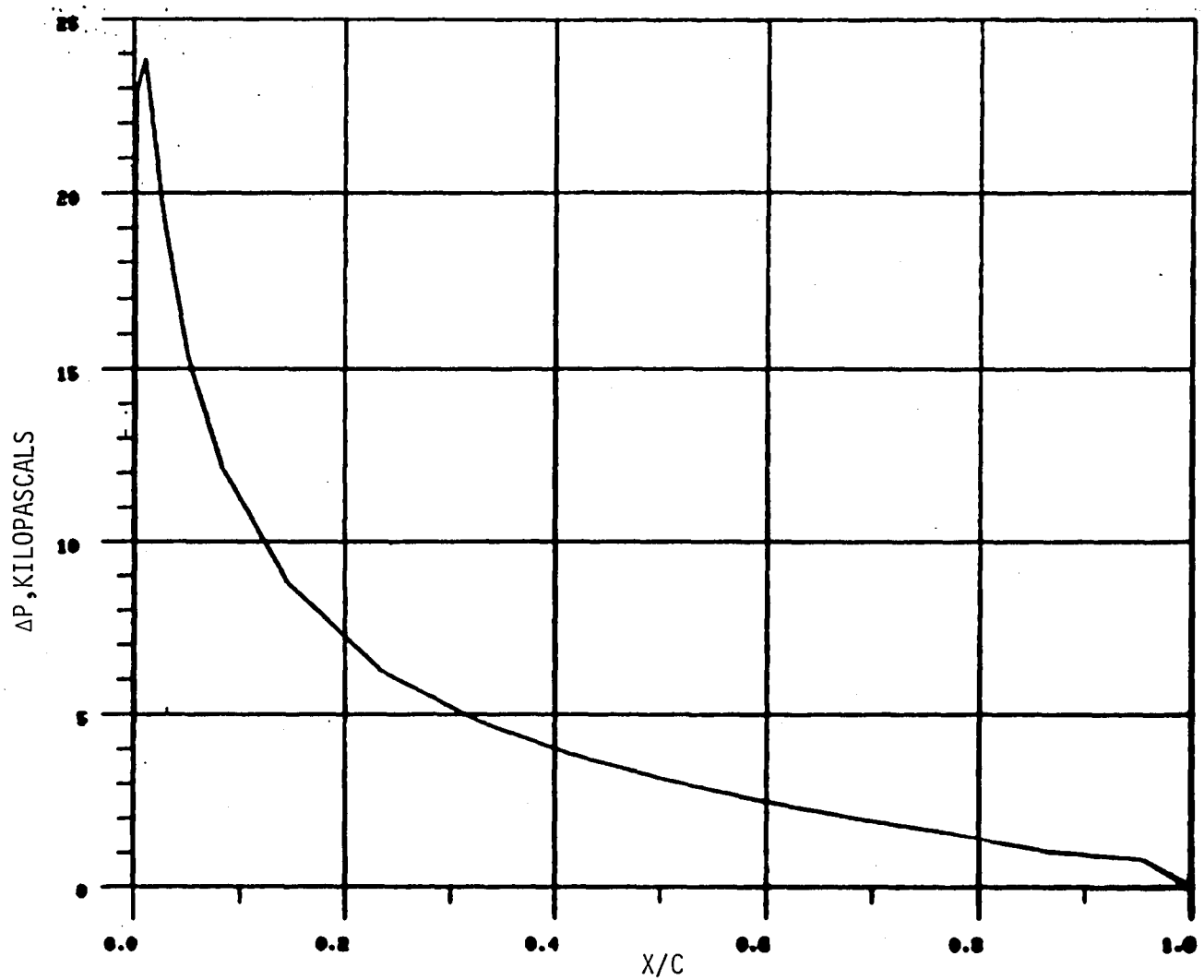

Figure A-4(f) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.75. Predicted input airload data.

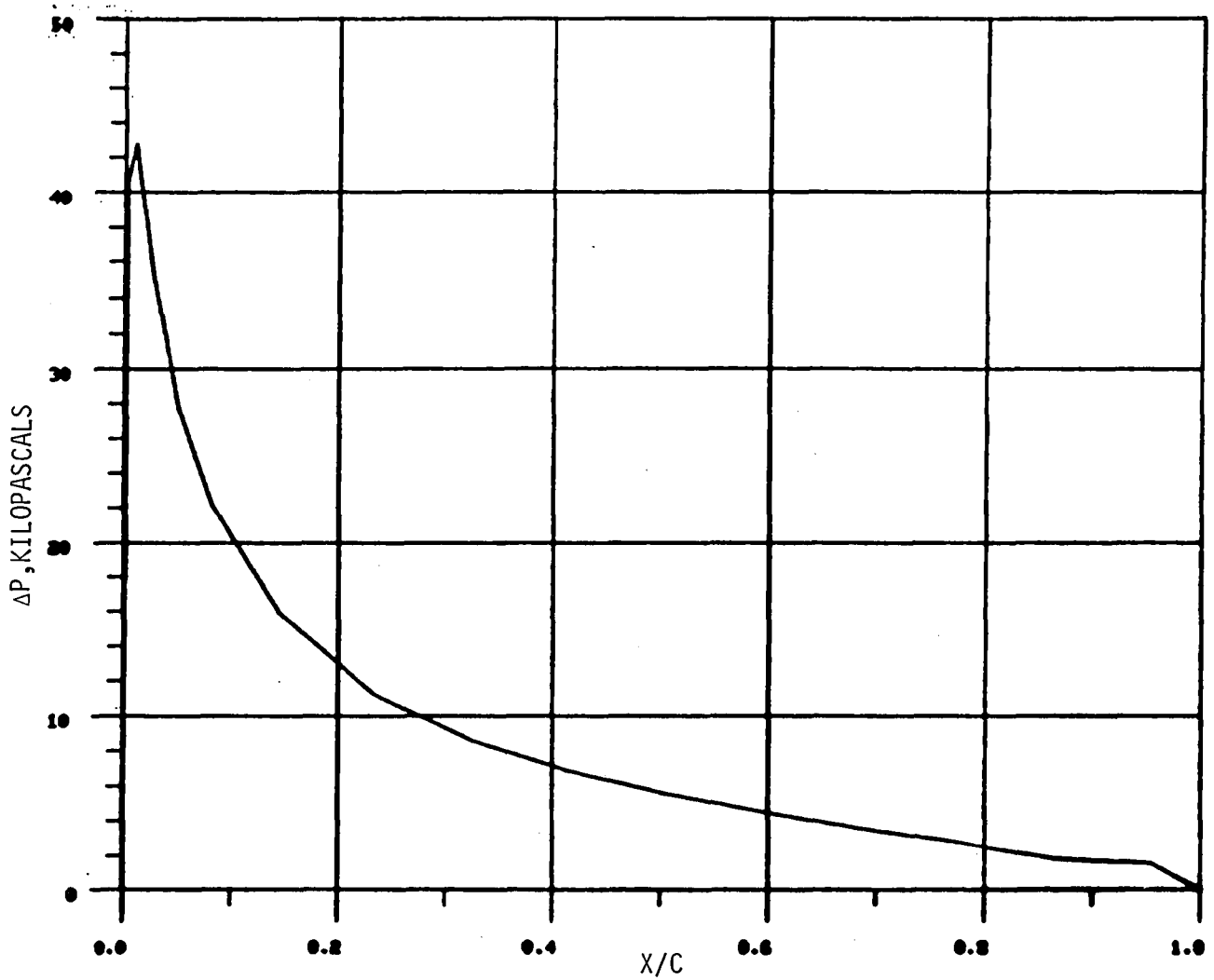

Figure A-4(g) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 48.9 m/sec (95 kt). r/R = 0.95. Predicted input airload data.

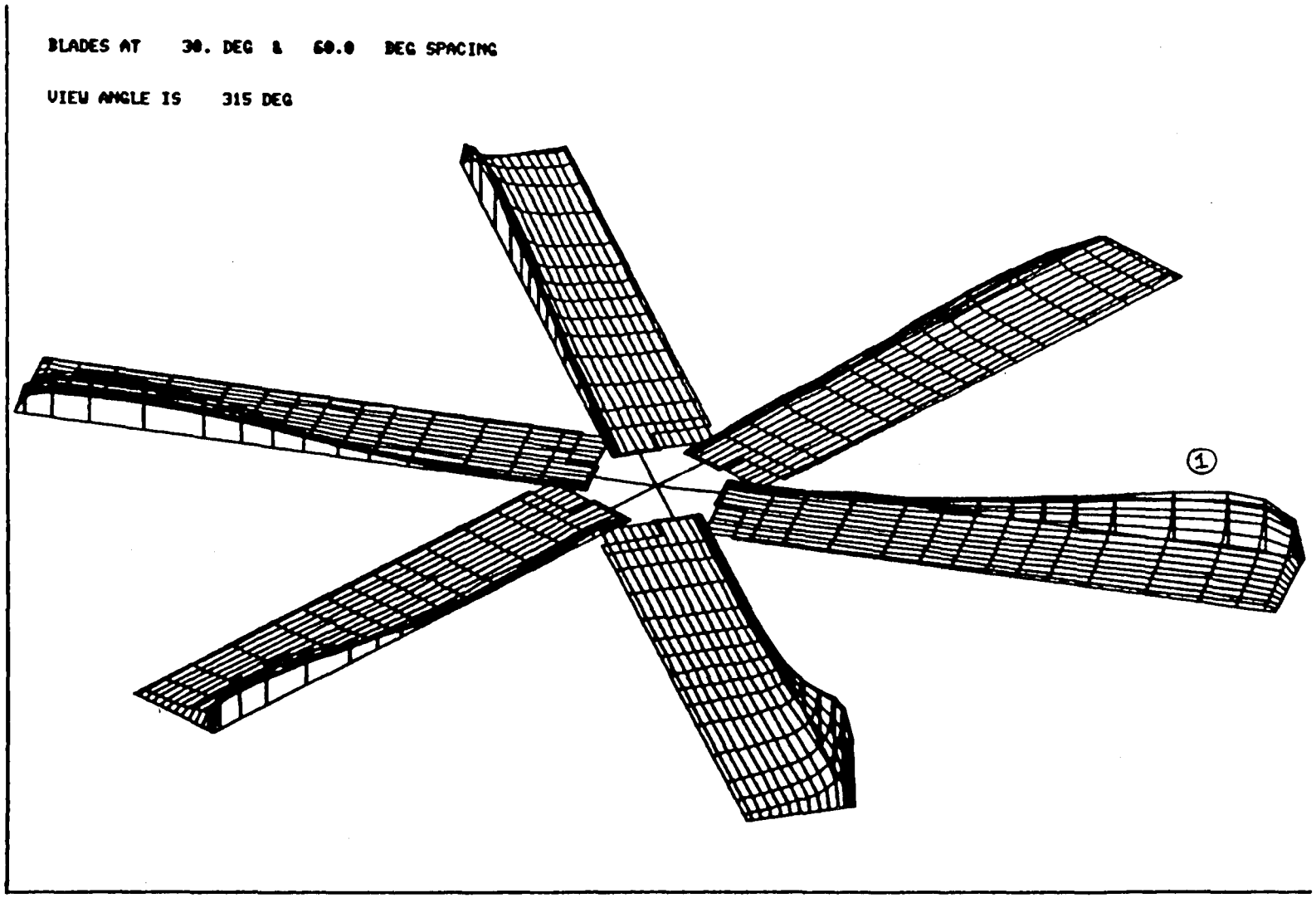

Figure A-5(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 30° azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

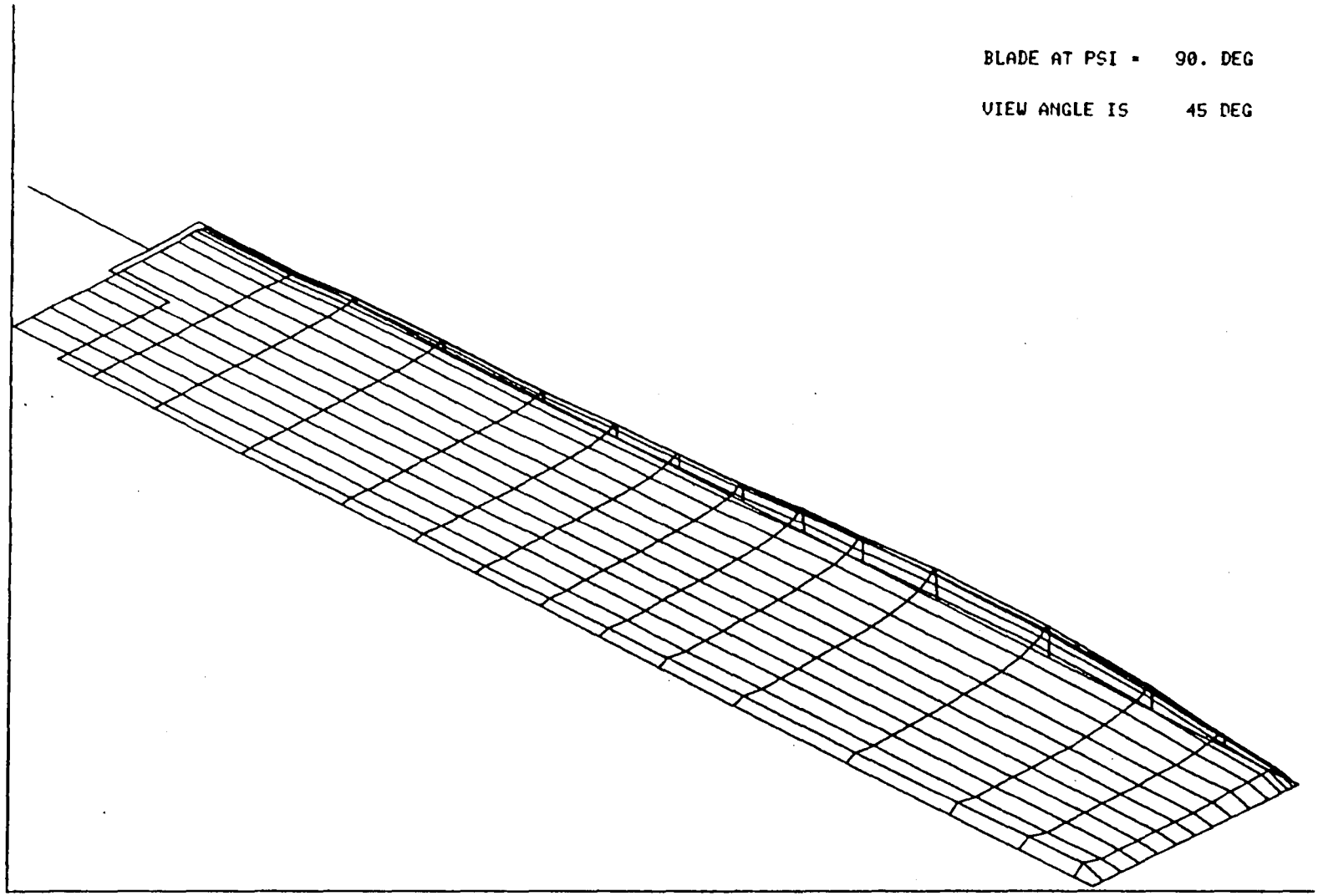

Figure A-5(b) - Isometric plot - spanwise and chordwise loading on blade positioned at 90° azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

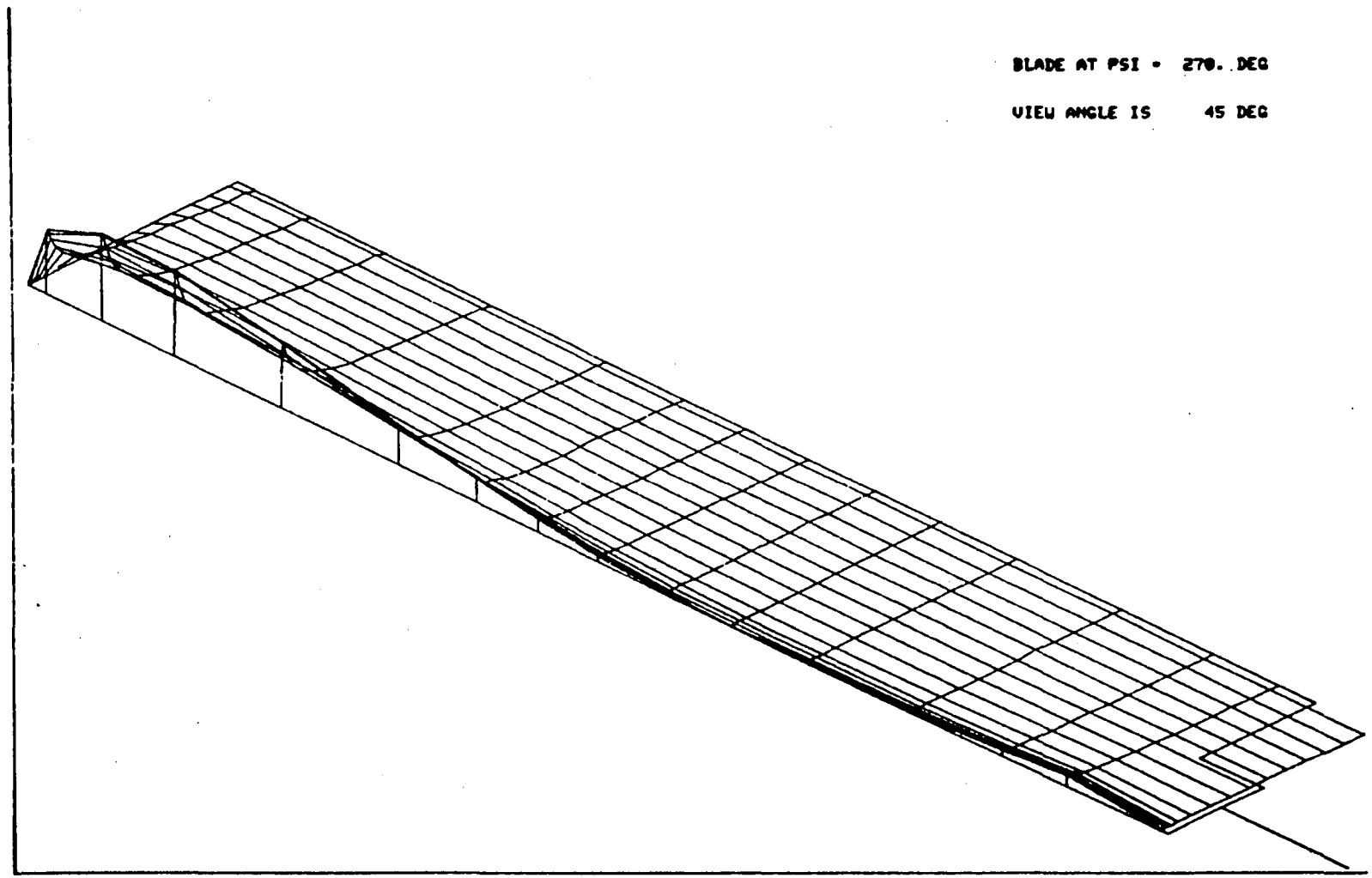

Figure A-5(c) - Isometric plot - spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 82.3 m/sec (160 kt). Predicted input airload data.

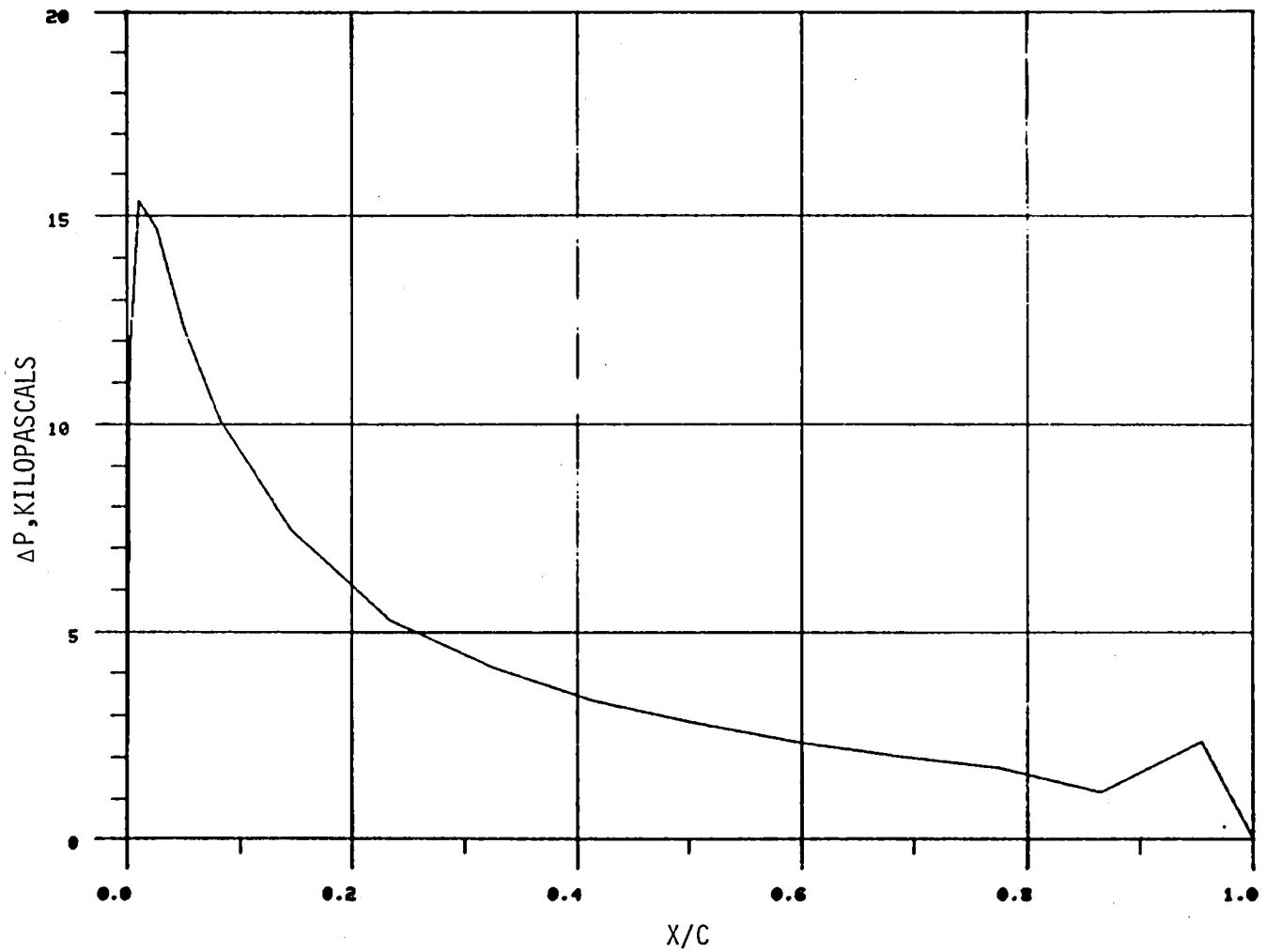

Figure A-5(d) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.75. Predicted input airload data.

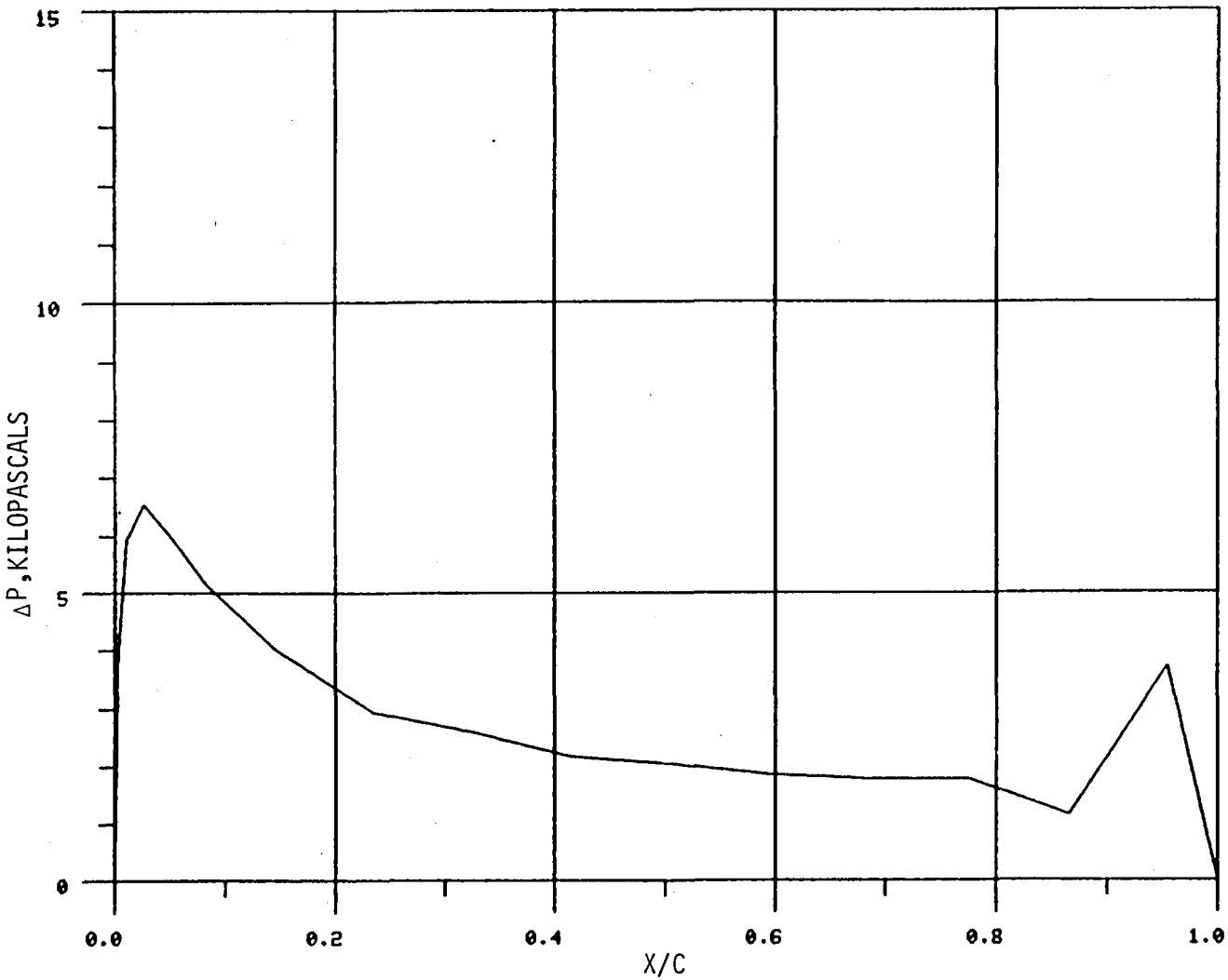

Figure A-5(e) - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.95. Predicted input airload data.

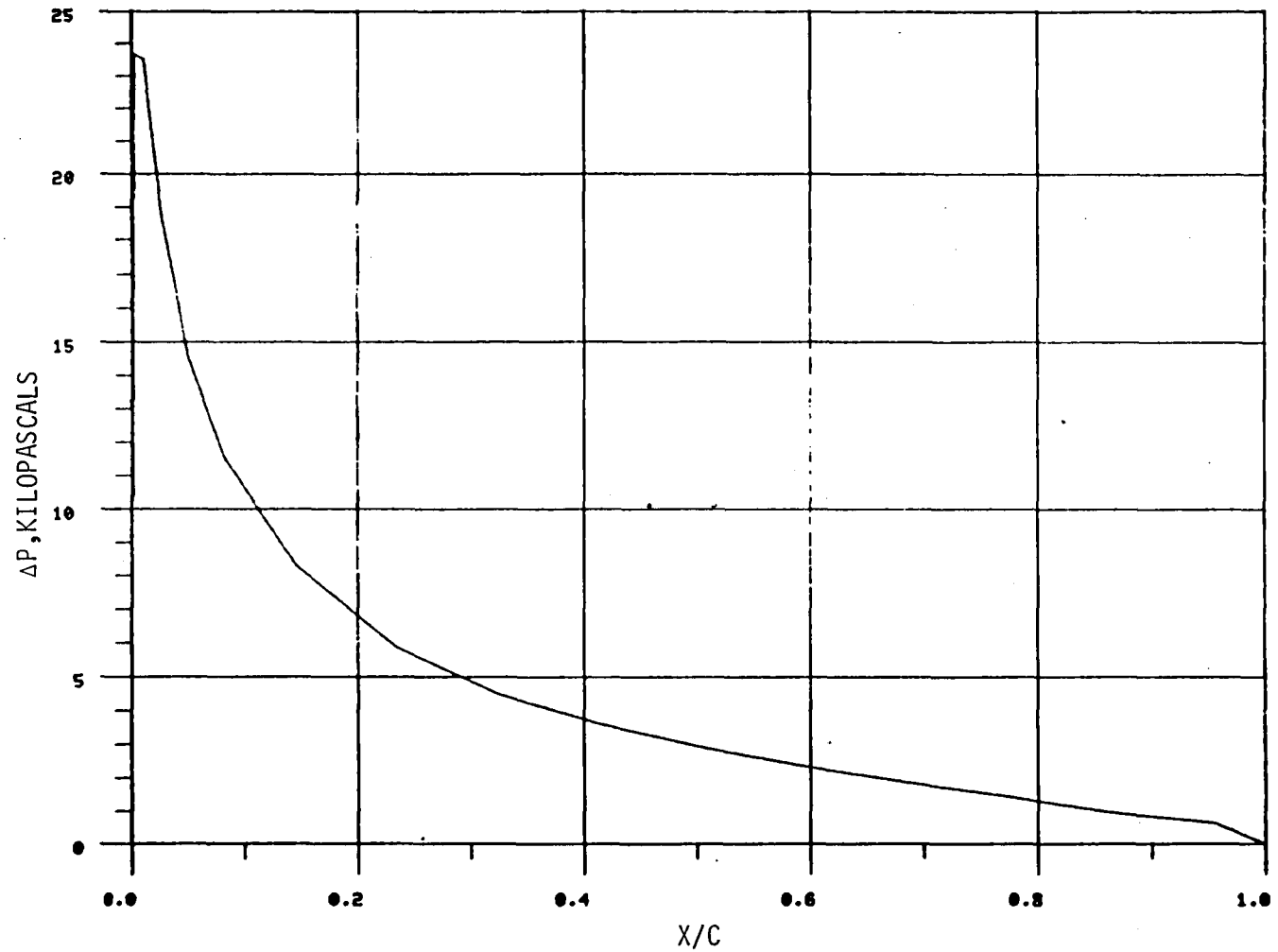

Figure A-5(f) - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.75. Predicted input airload data.

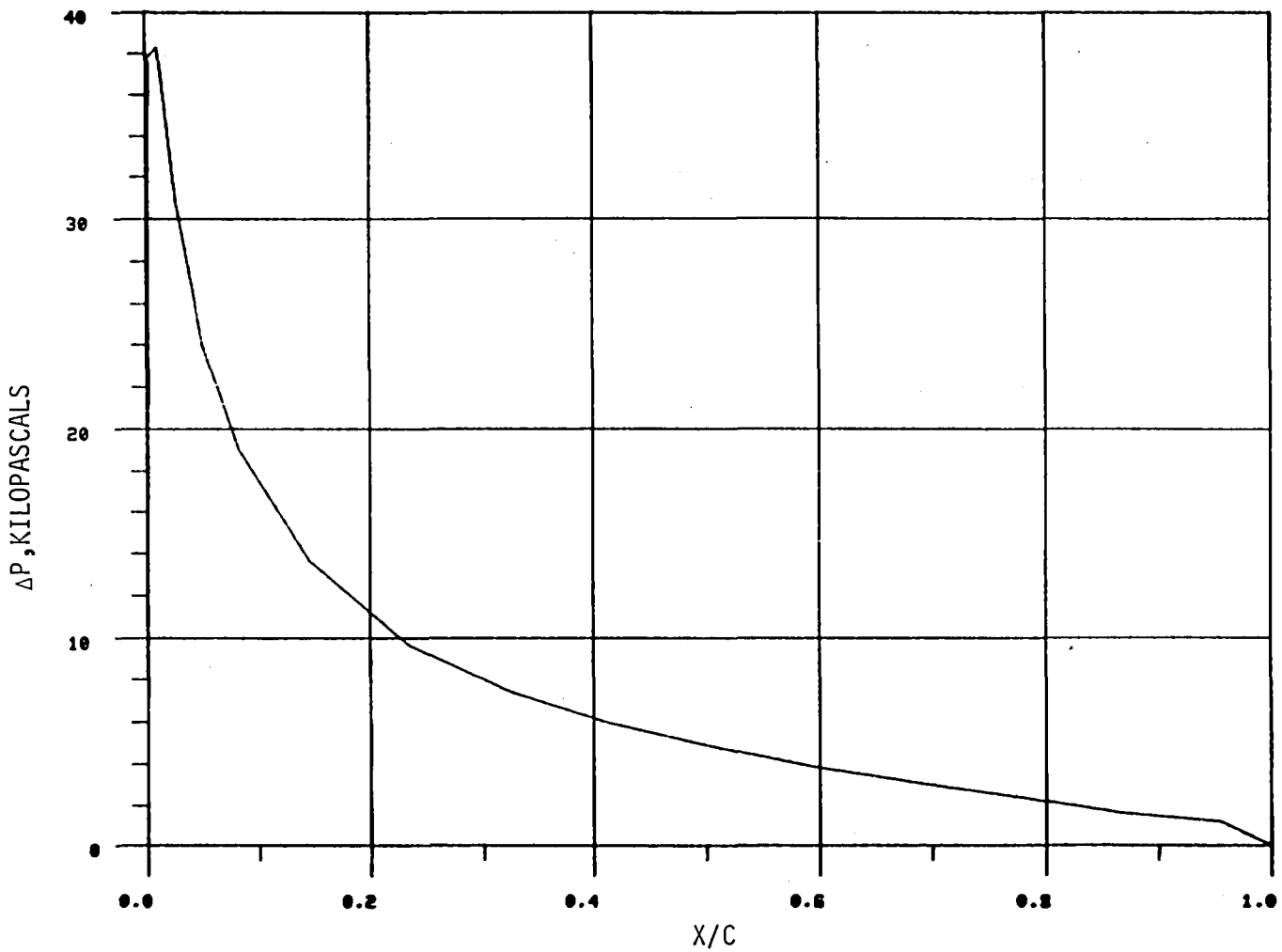

Figure A-5(g) - Chordwise pressure distribution. Blade positioned at 270^0 azimuth position. V = 82.3 m/sec (160 kt). r/R = 0.95. Predicted input airload data.

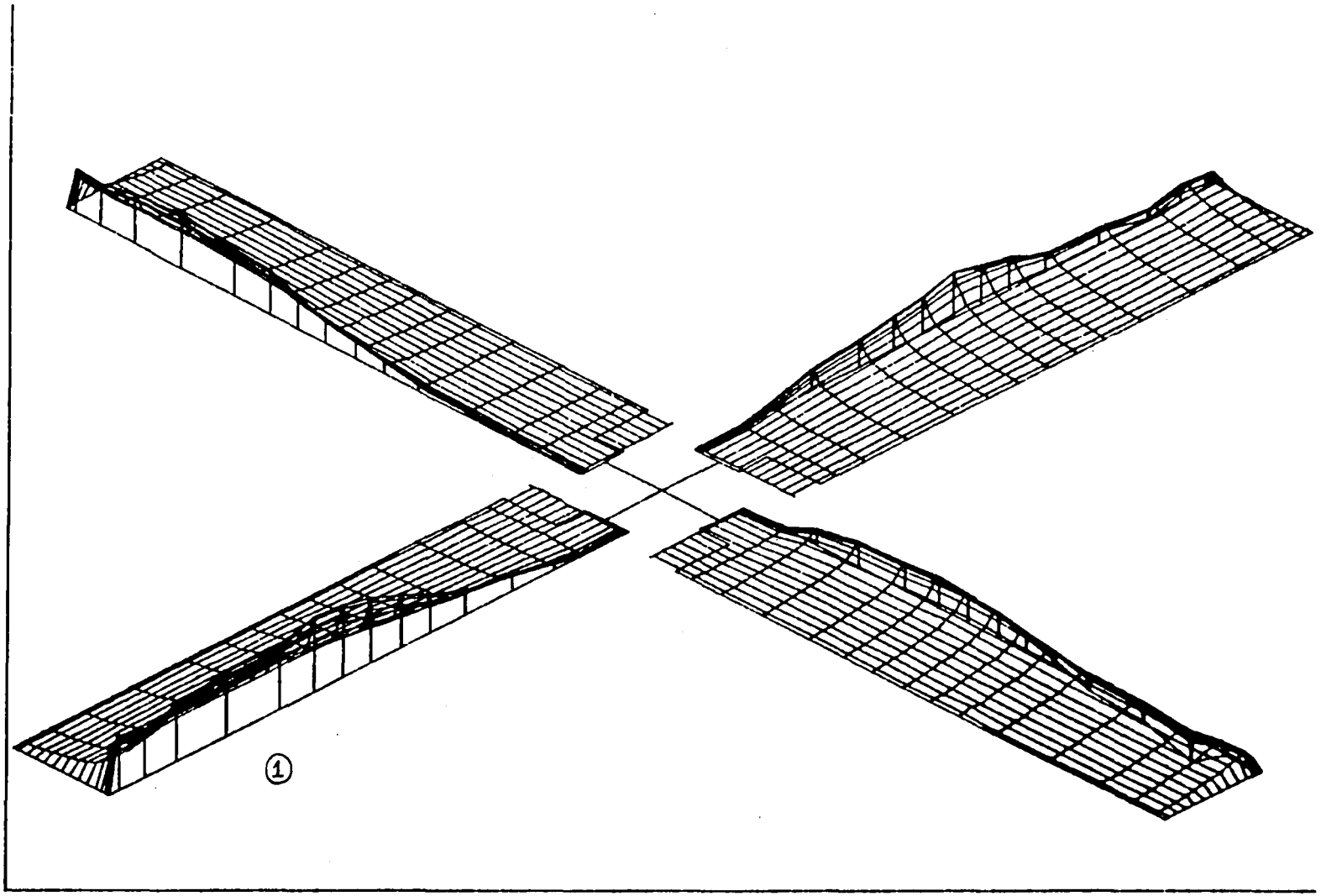

Figure A-6(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 0° azimuth position. V = 51.4m/sec (100 kt). Predicted input airload data.

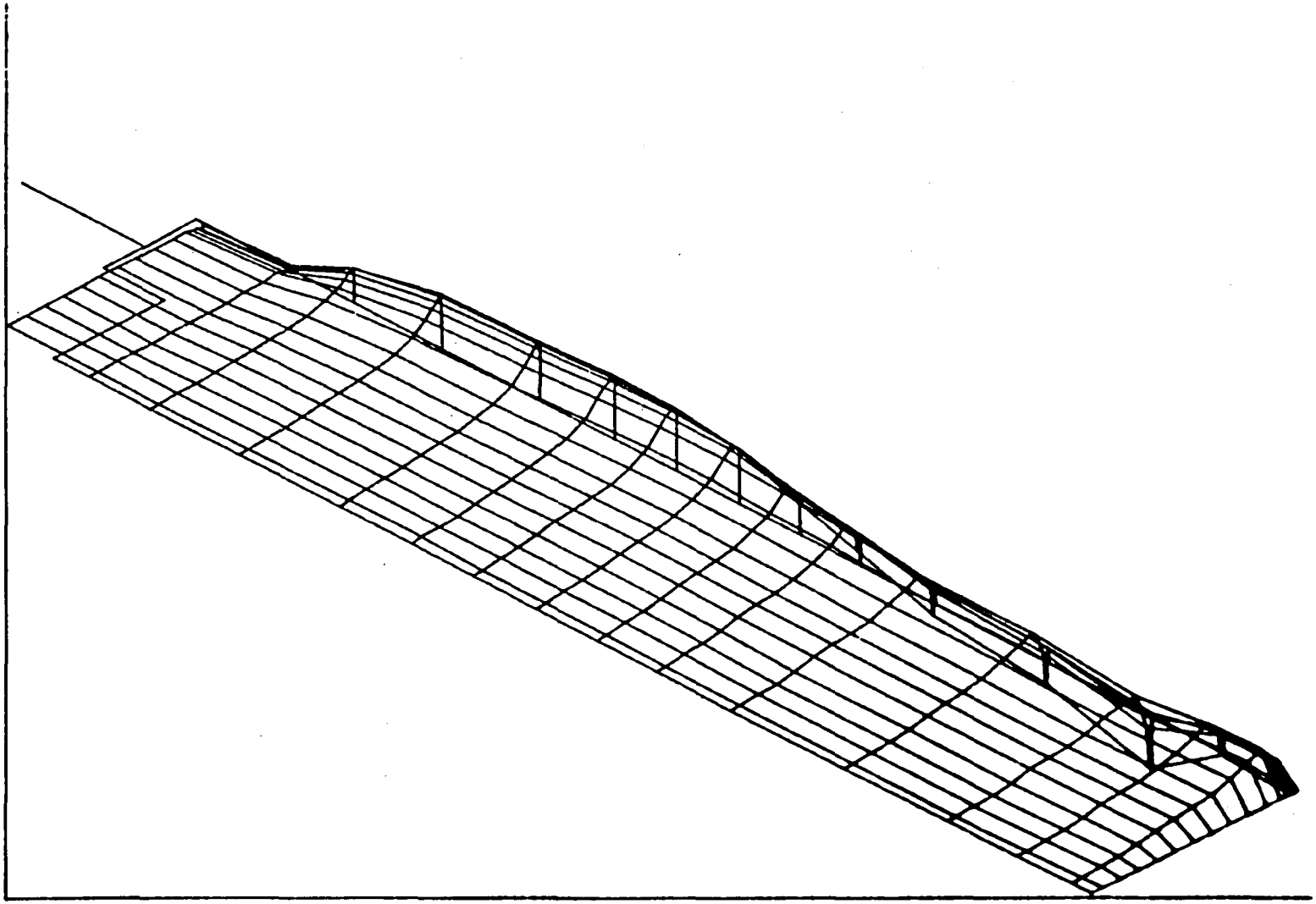

Figure A-6(b). - Isometric plot - spanwise and chordwise loading on blade positioned at 90^{o} azimuth position. V = 51.4 m/sec (100 kt). Predicted input airload data.

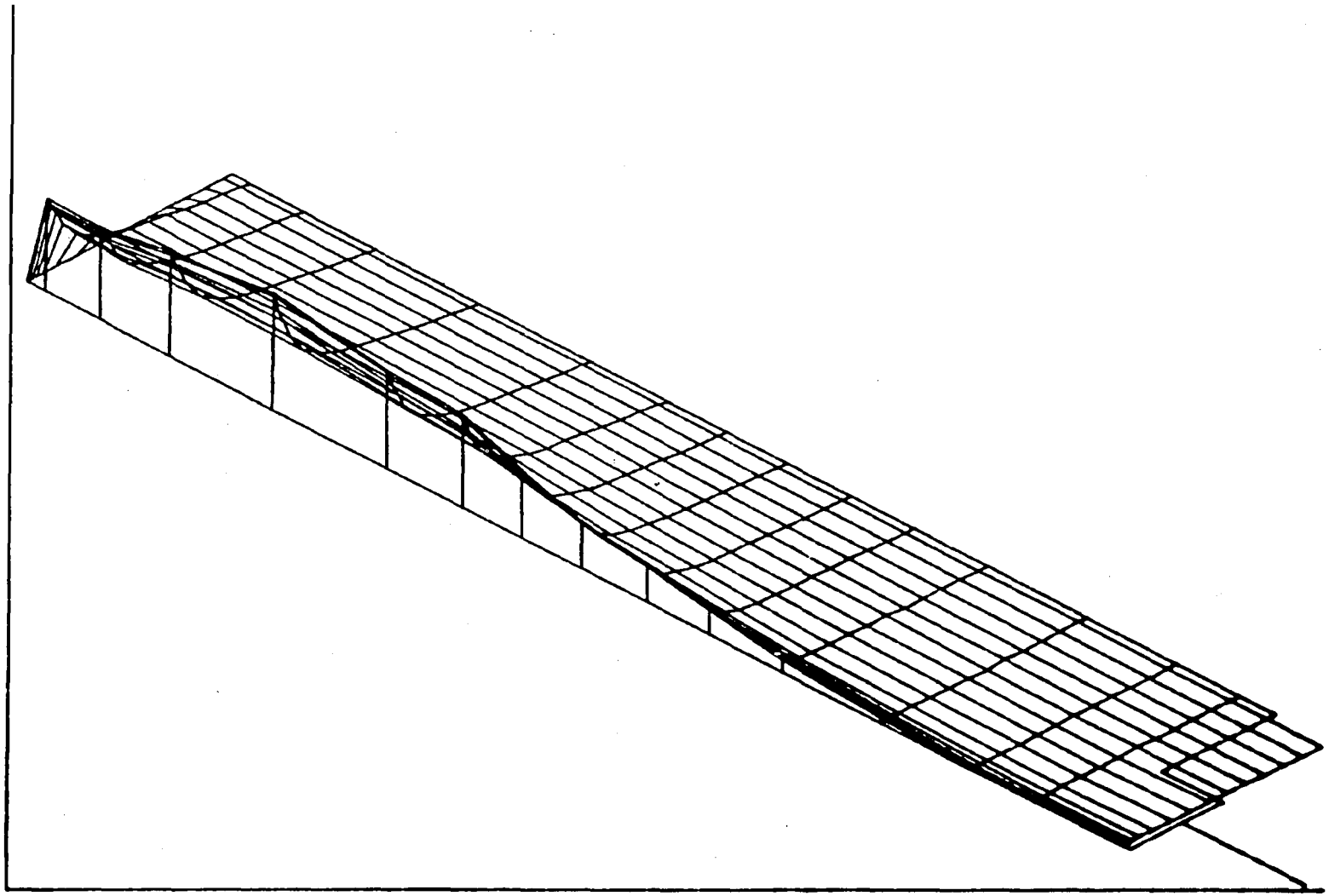

Figure A-6(c). - Isometric plot-spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 51.4 m/sec (100 kt). Predicted input airload data.

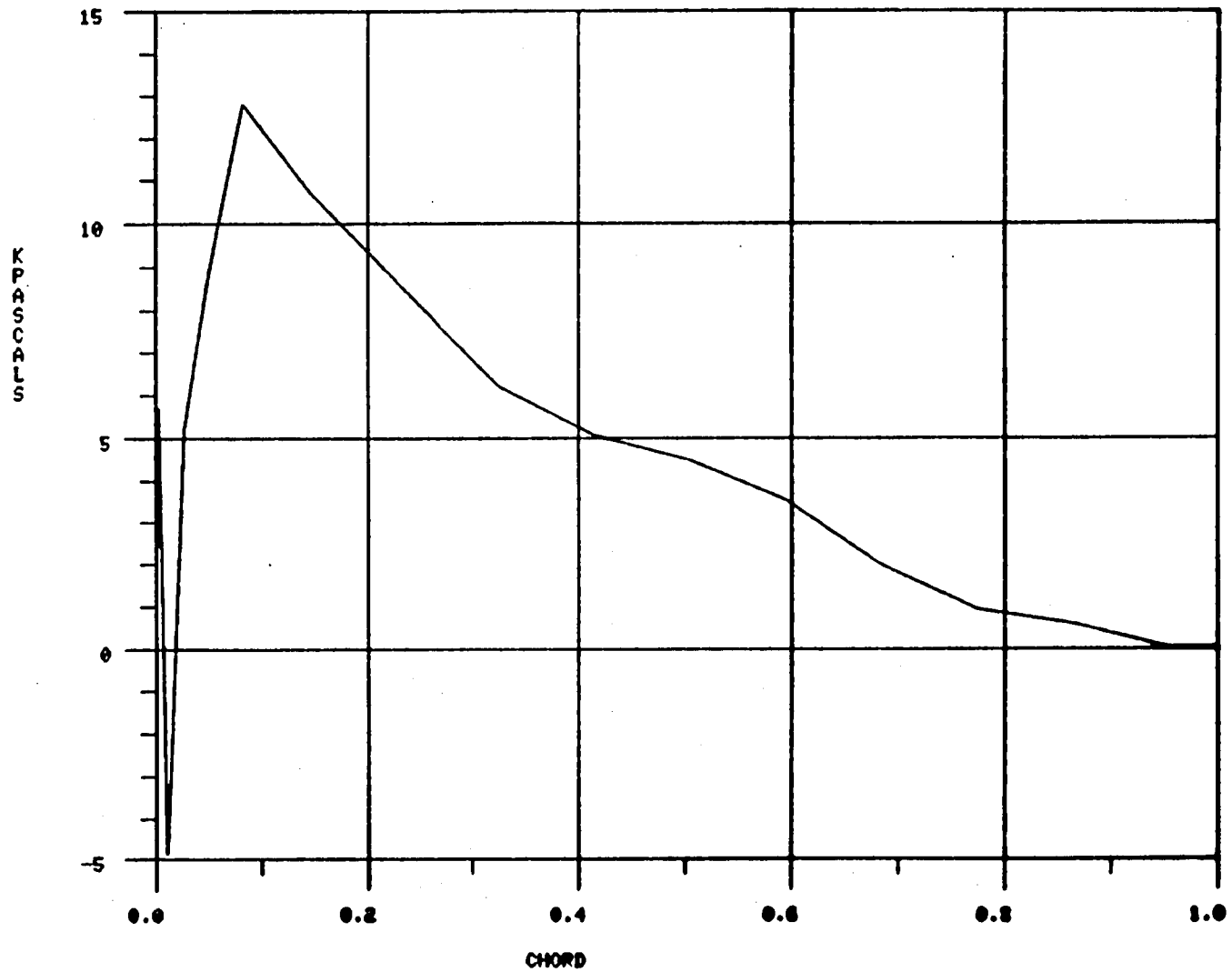

Figure A-6(d). - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 51.4 m/sec (100 kt). r/R = 0.75. Predicted input airload data.

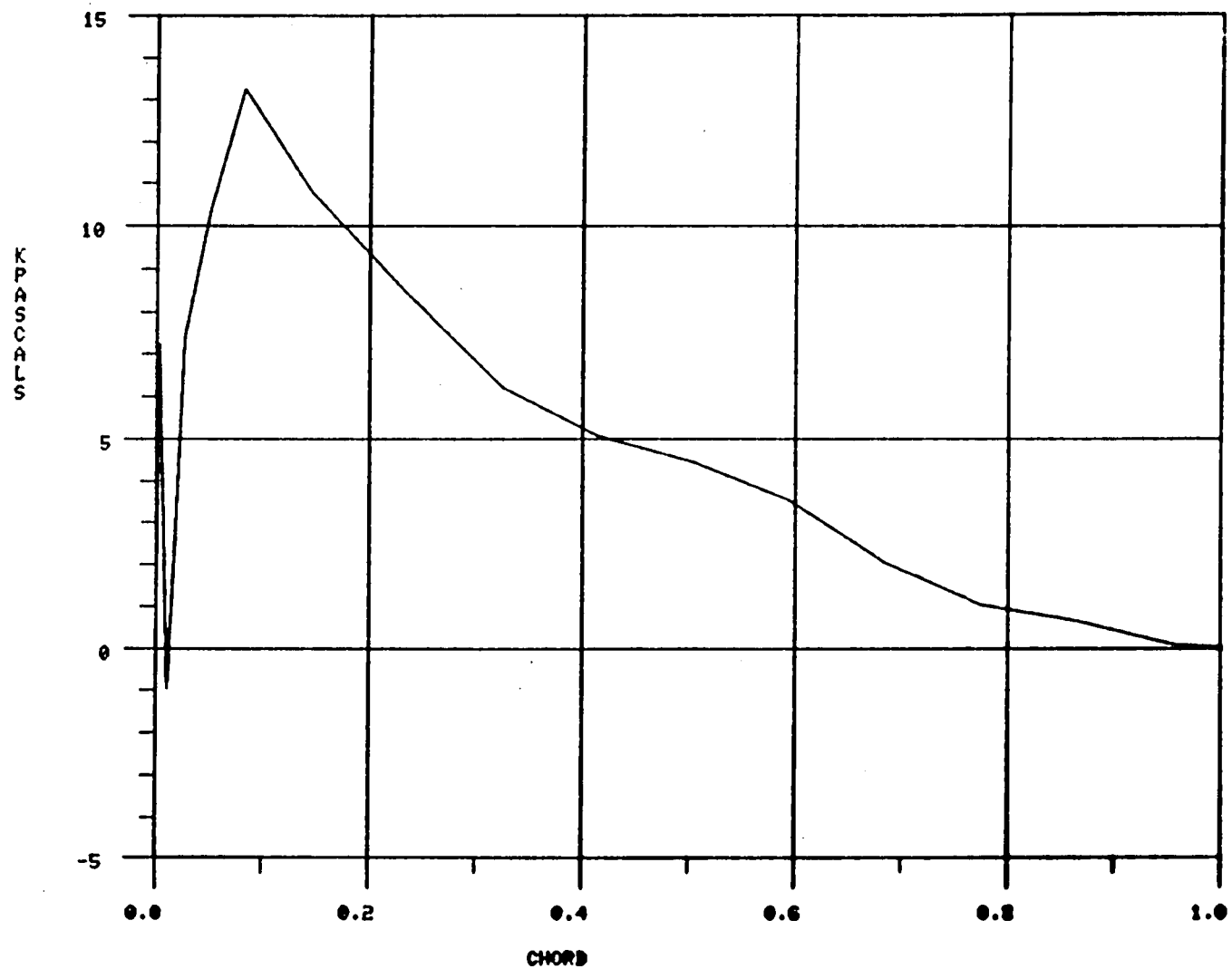

Figure A-6(e). - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V= 51.4 m/sec (100 kt). r/R = 0.95. Predicted input airload data.

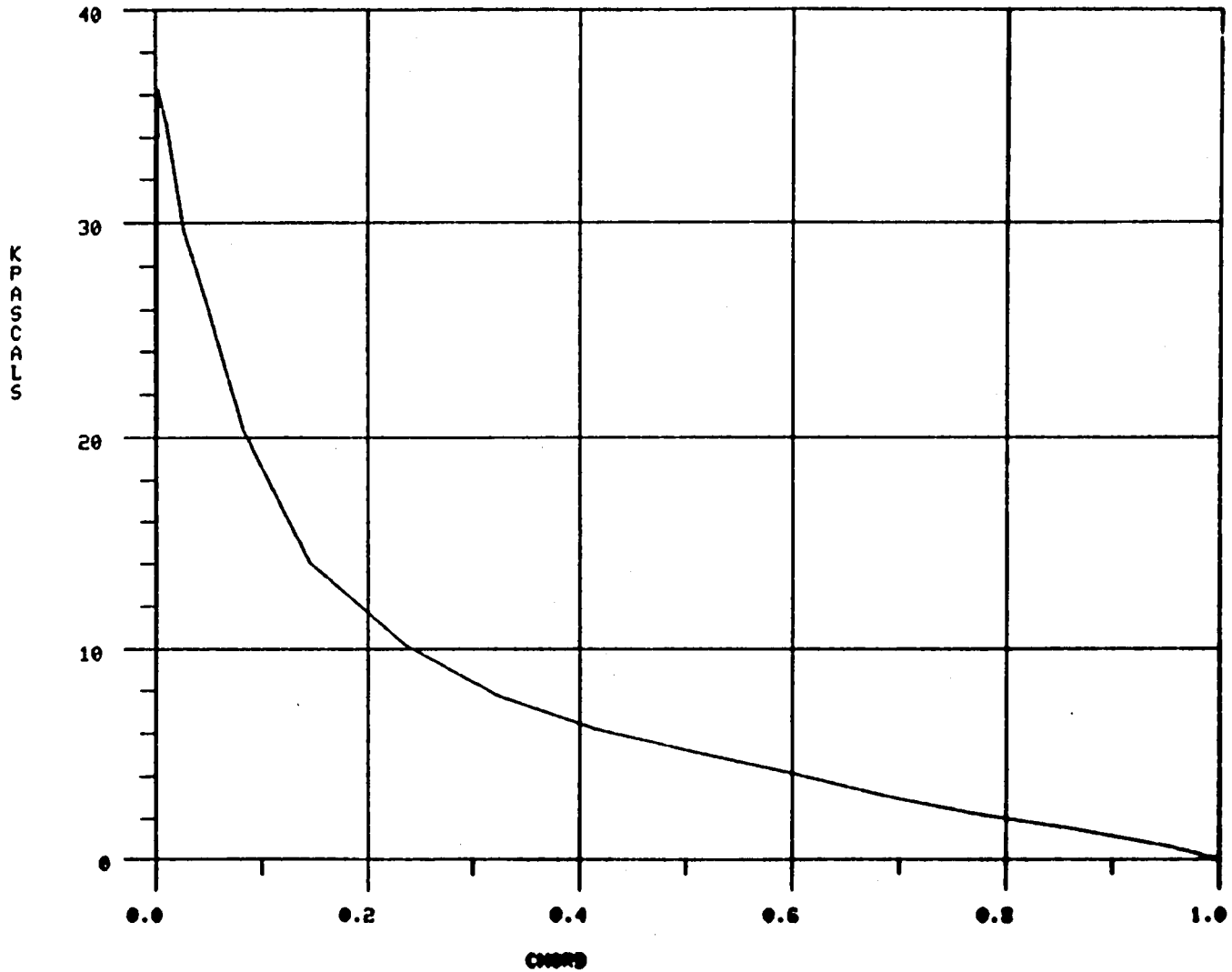

Figure A-6(f). - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 51.4 m/sec (100 kt). r/R = 0.95. Predicted input airload data.

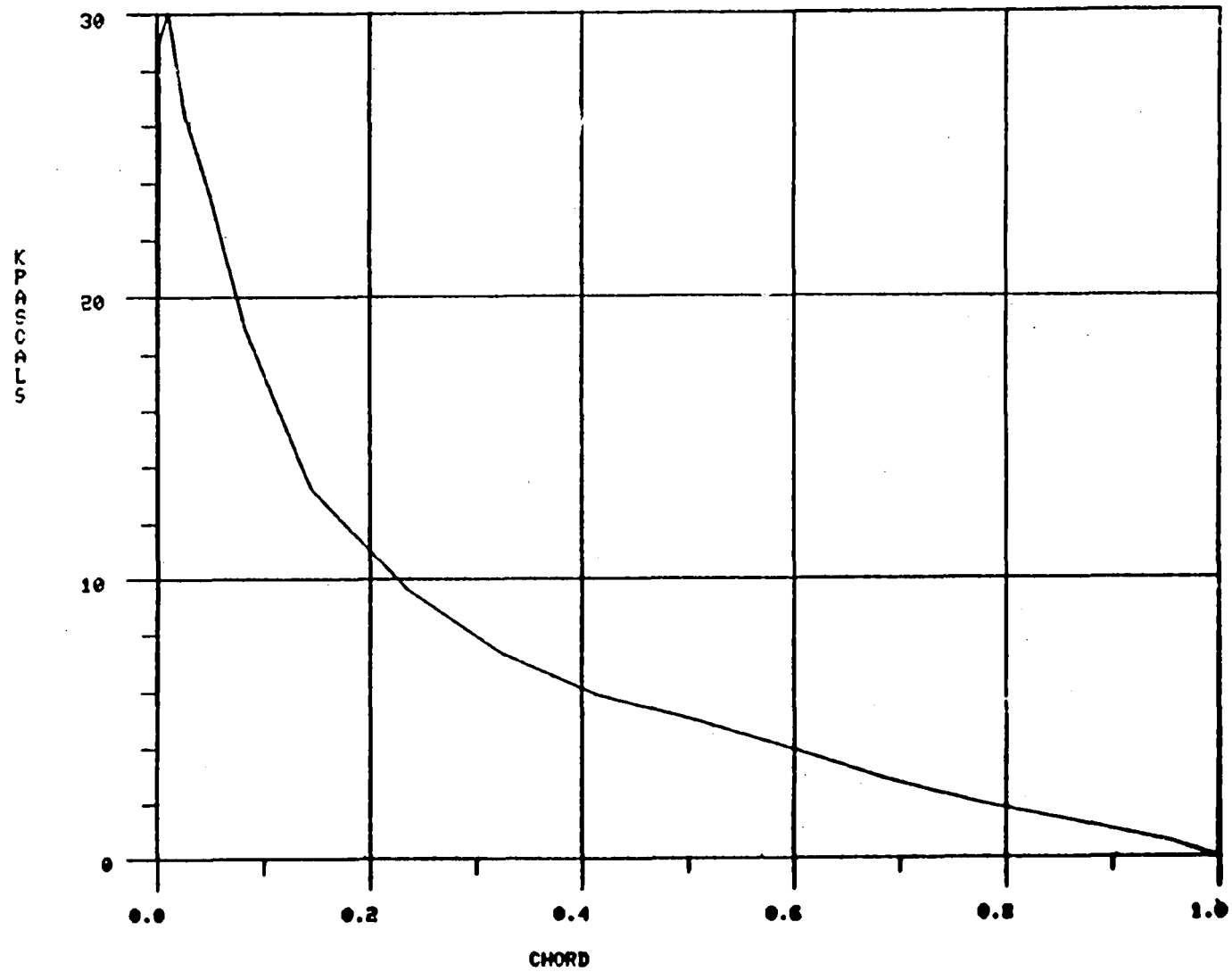

Figure A-6(g). - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 51.4 m/sec (100 kt). r/R = 0.95. Predicted input airload data.

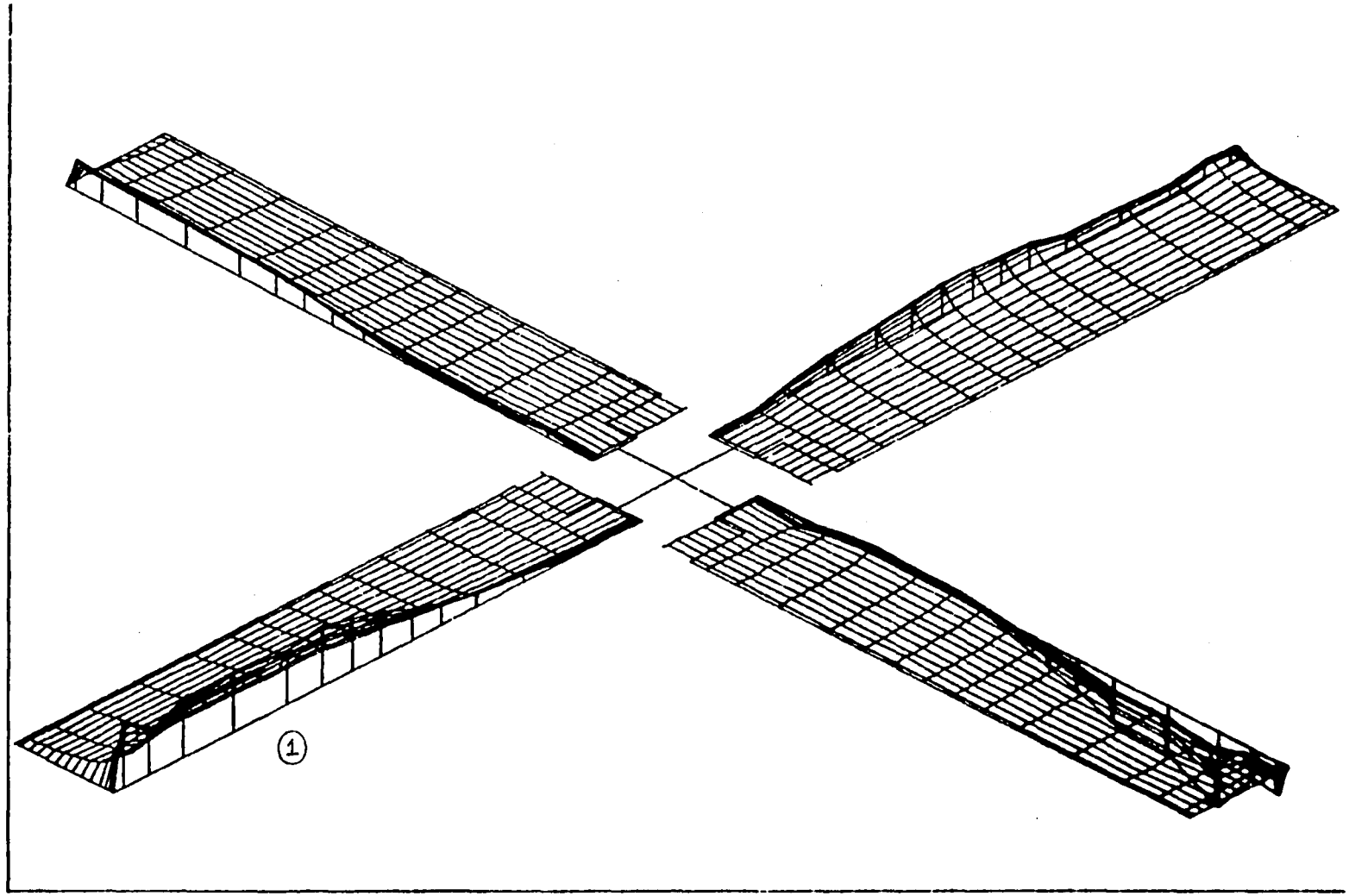

Figure A-7(a) - Isometric plot - spanwise and chordwise loading on all size blades. Blade 1 positioned at 0^{0} azimuth position. V = 72.02m/sec (140 kt). Predicted input airload data.

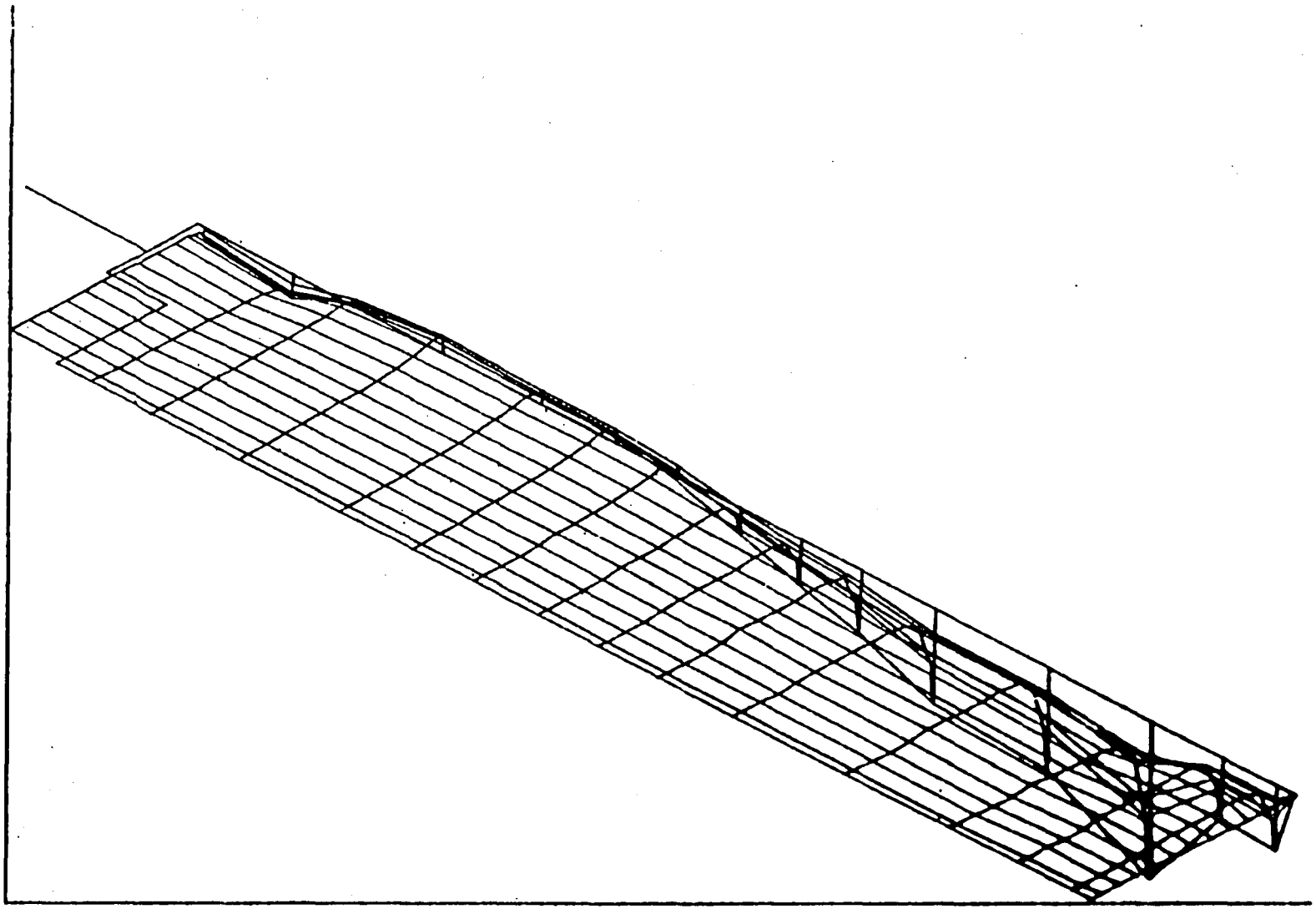

Figure A-7(b). - Isometric plot-spanwise and chordwise loading on blade positioned at 90° aximuth position. V = 72.02 m/sec (140 kt). Predicted input airload data.

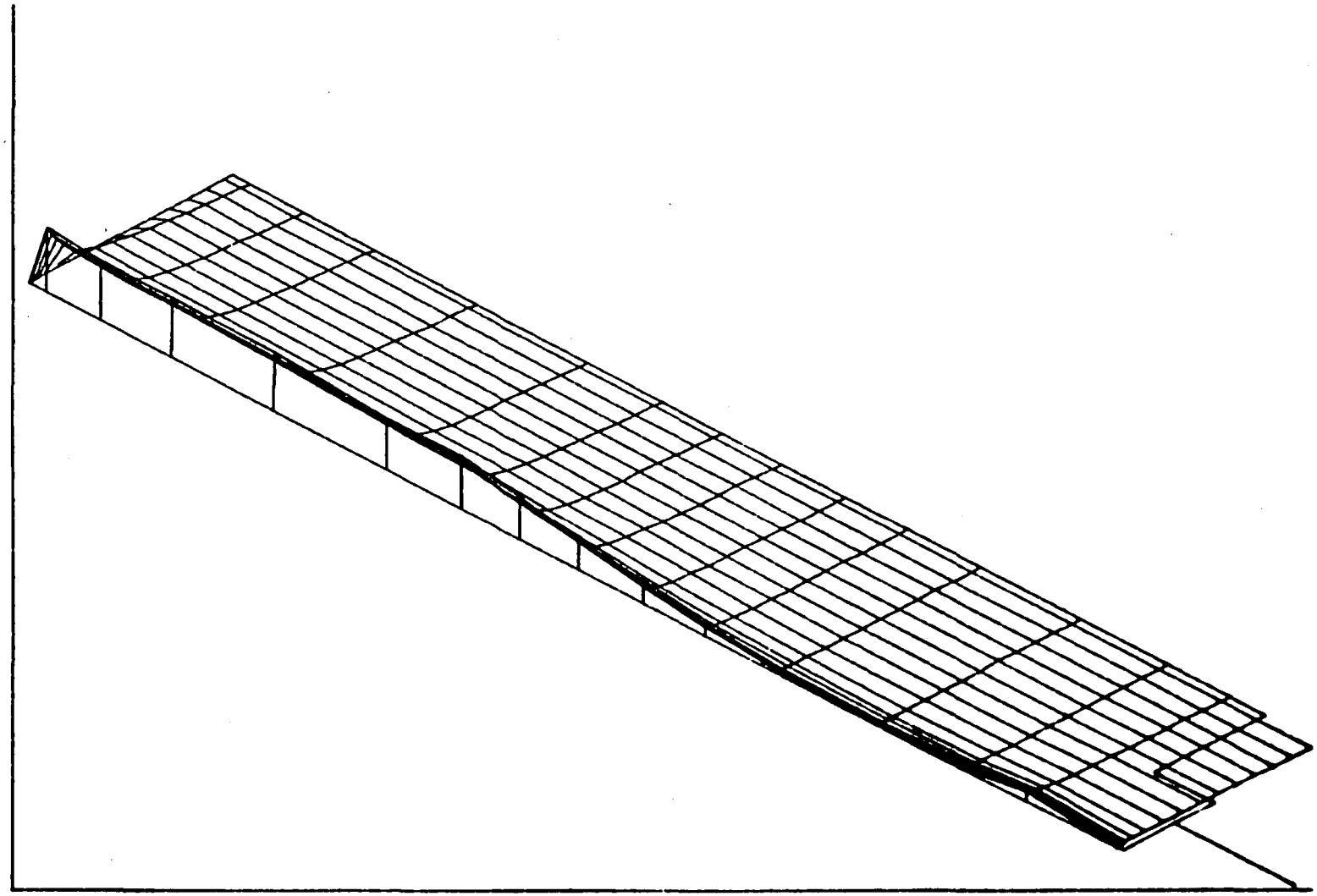

Figure A-7(c) - Isometric plot-spanwise and chordwise loading on blade positioned at 270° azimuth position. V = 72.02 m/sec (140 kt). Predicted input airload data.

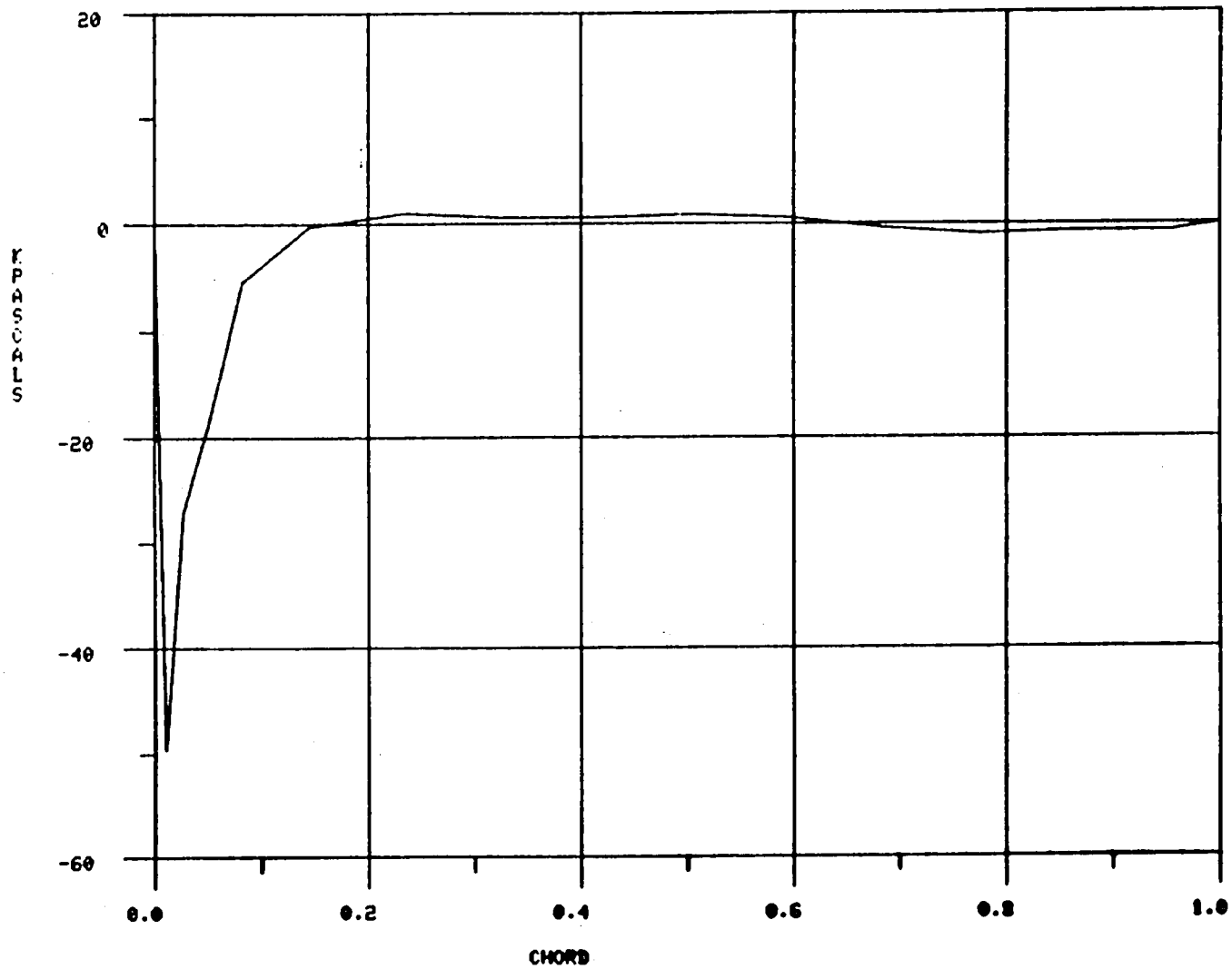

Figure A-7(d). - Chordwise pressure distribution. Blade positioned at 90^{o} azimuth position. V = 72.02 m/sec (140 kt). r/R = 0.75. Predicted input airload data.

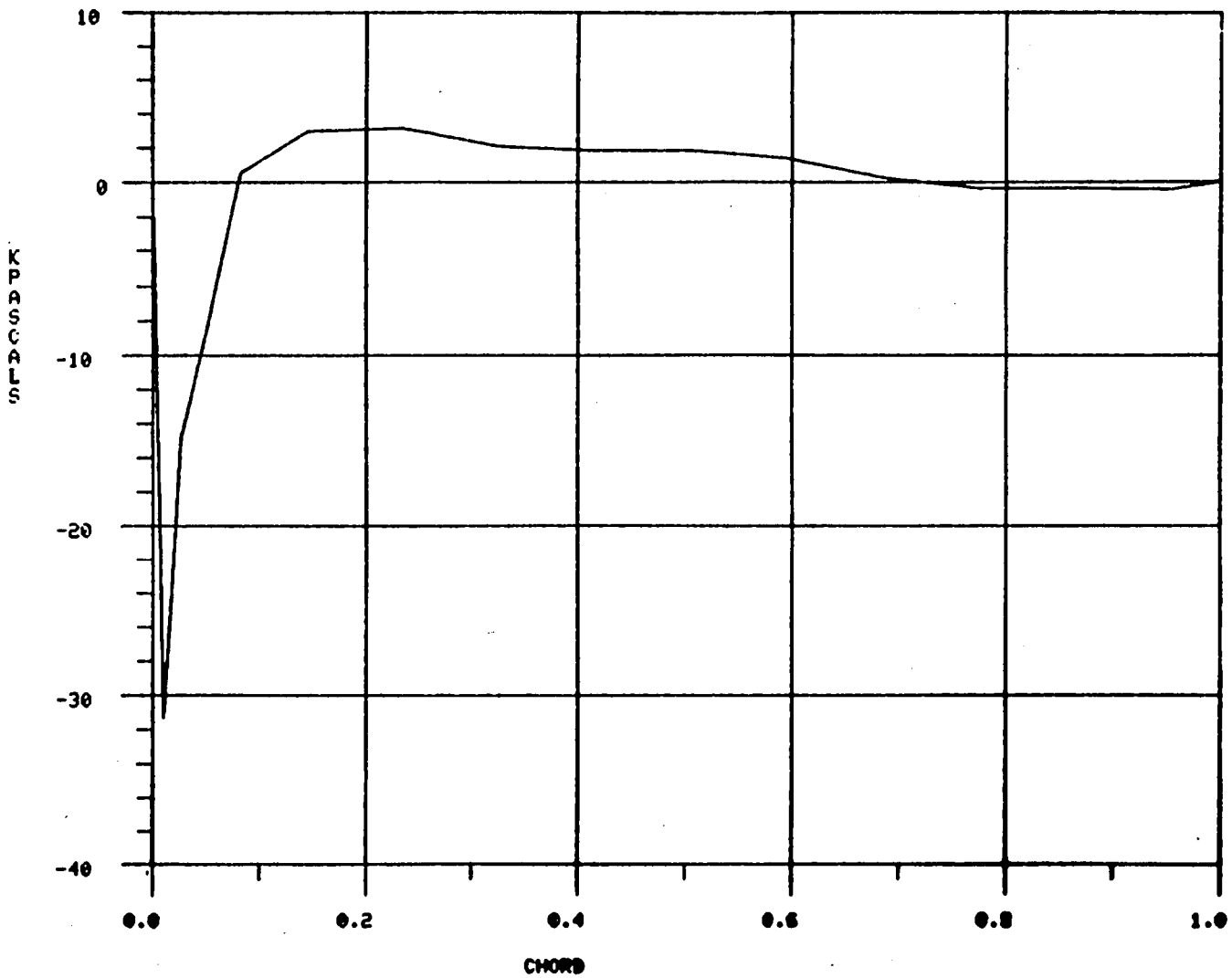

Figure A-7(e). - Chordwise pressure distribution. Blade positioned at 90° azimuth position. V = 72.02 m/sec (140 kt). r/R = 0.75. Predicted input airload data.

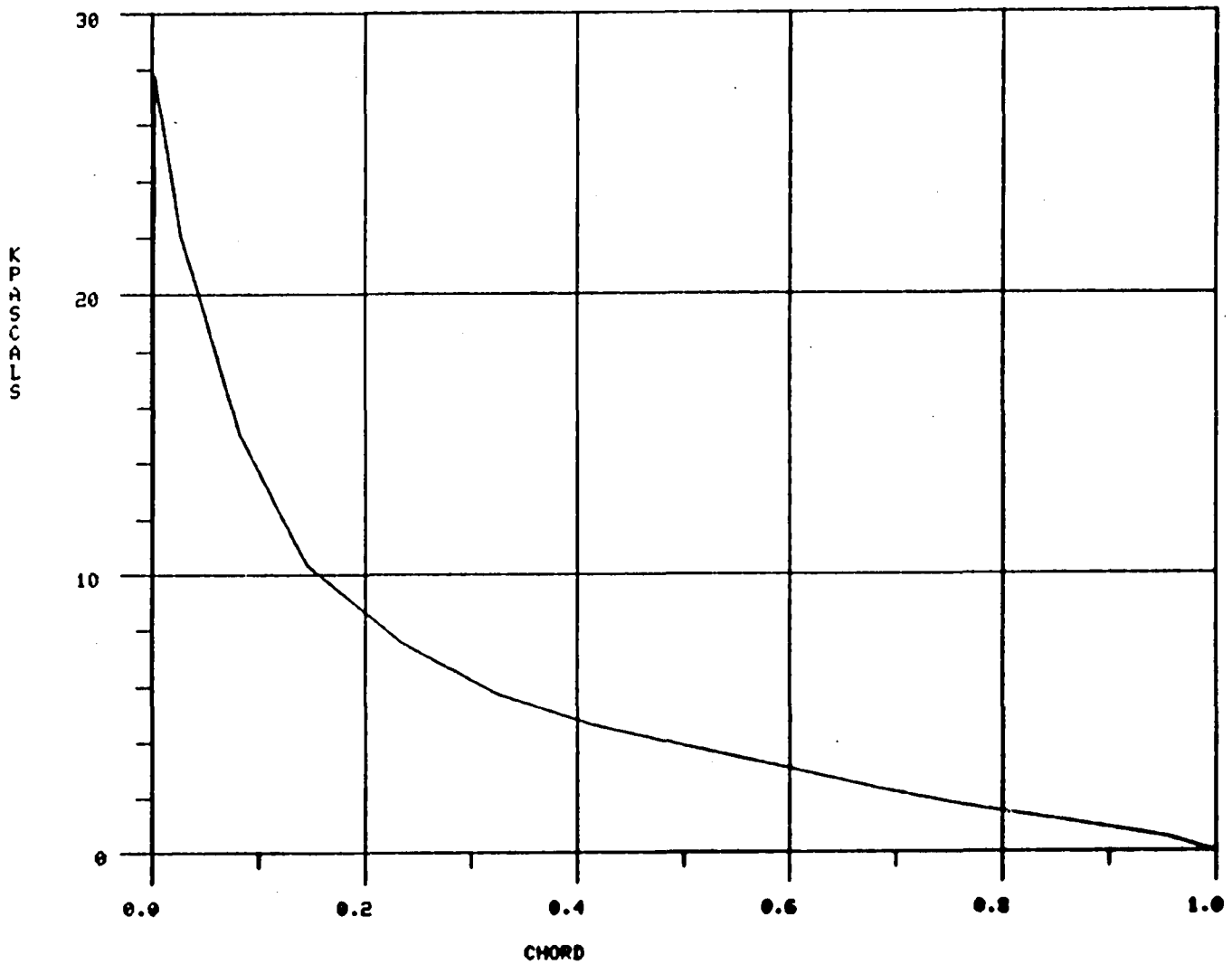

Figure A-7(f). - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 72.02m/sec (140 kt). r/R = 0.75.Predicted input airload data.

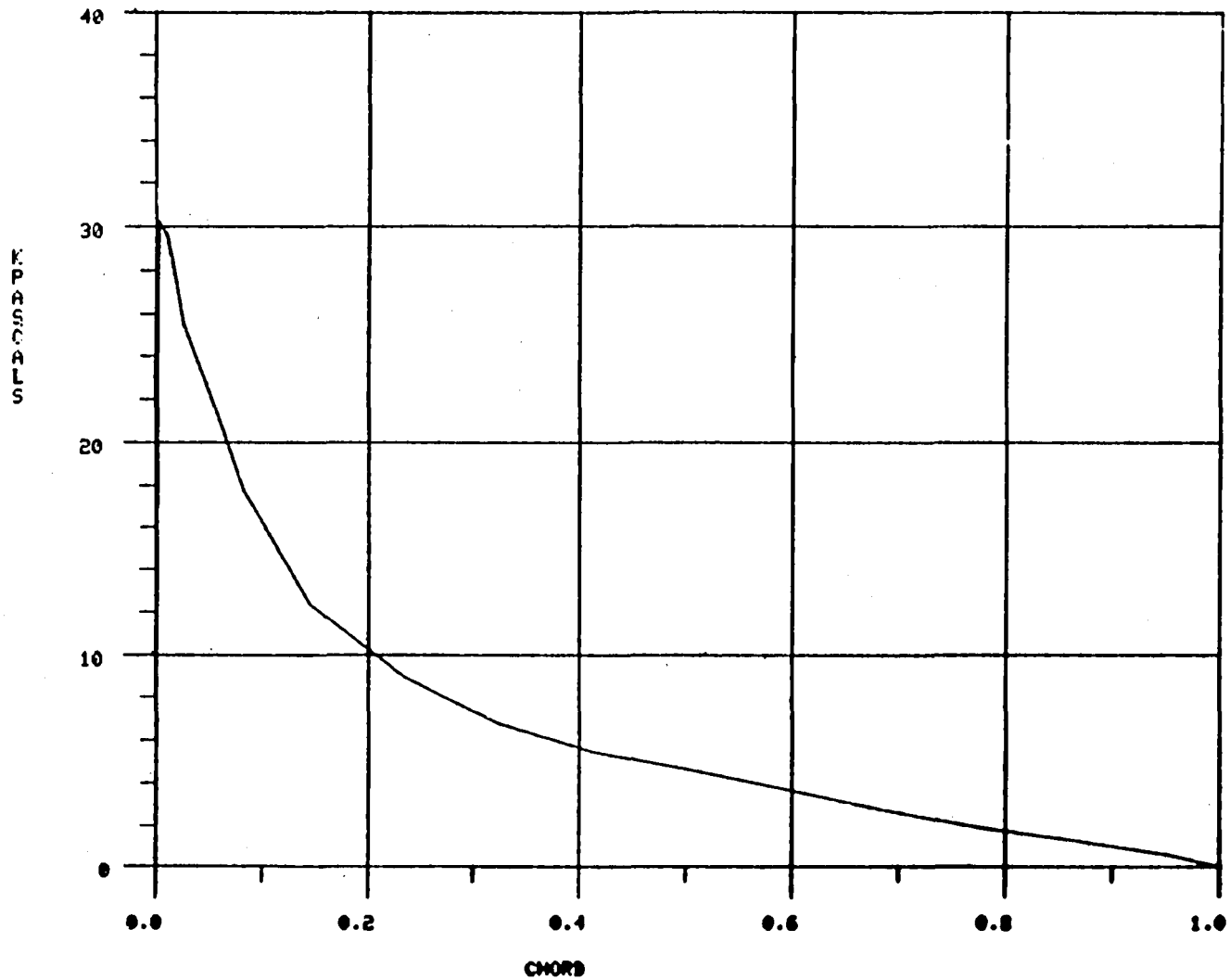

Figure A-7(g). - Chordwise pressure distribution. Blade positioned at 270° azimuth position. V = 72.02 m/sec (140 kt). r/R = 0.95. Predicted input airload data.

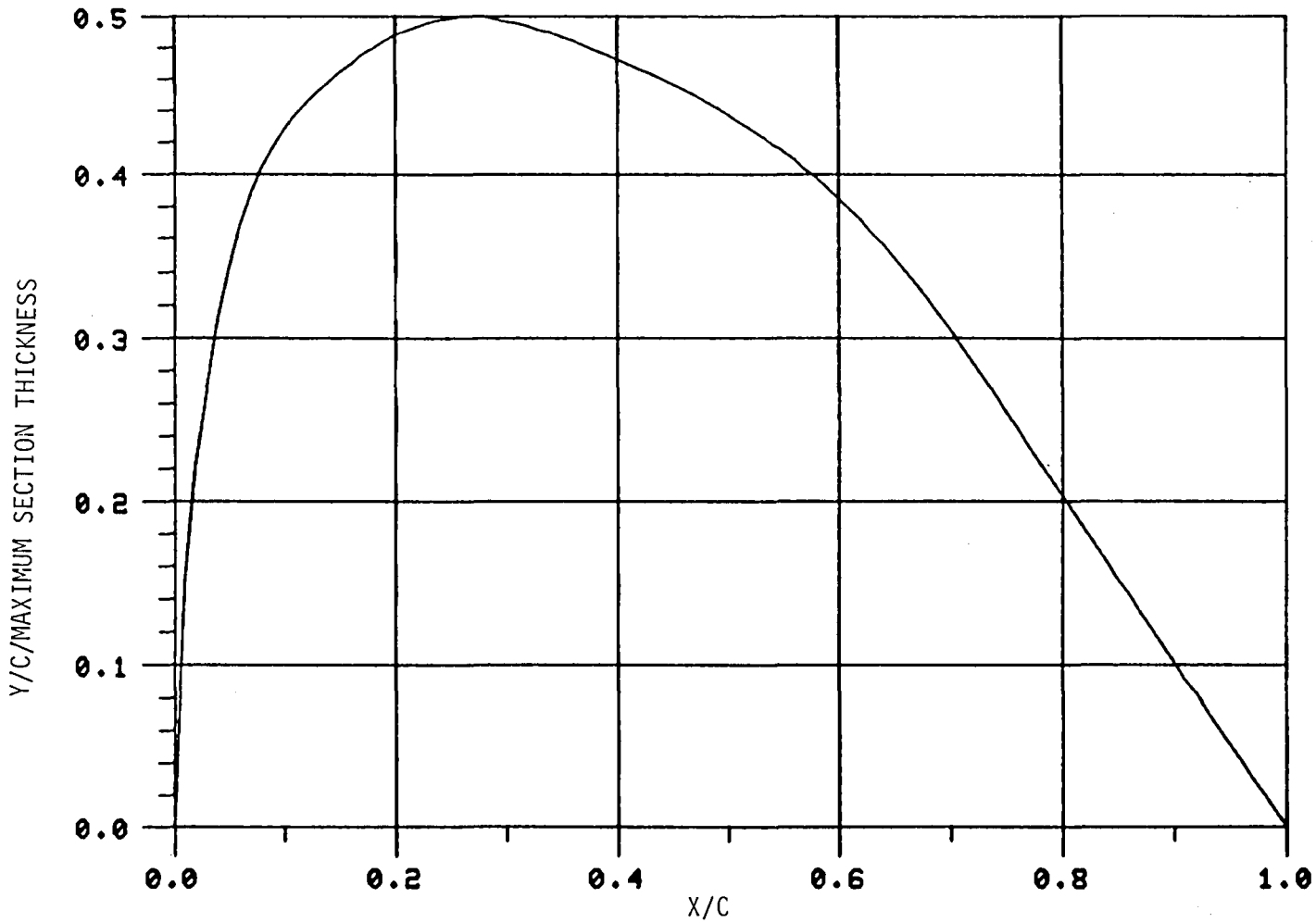

Figure A-8(a) - S-76 main rotor characteristics. Normalized thickness distribution vs. nondimensional section chord.

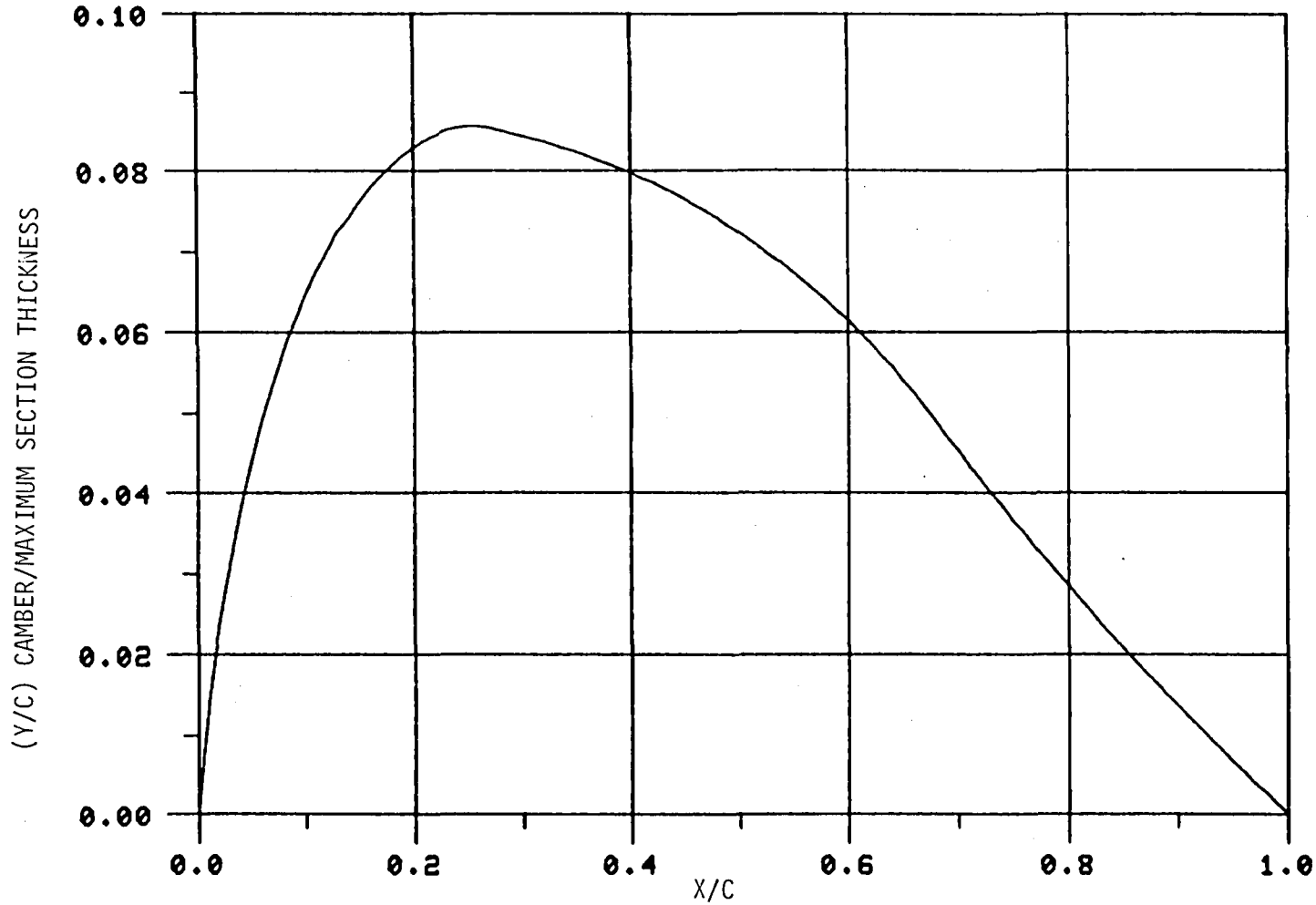

Figure A-8(b) - S-76 main rotor characteristics. Normalized camber distribution vs. nondimensional section chord.

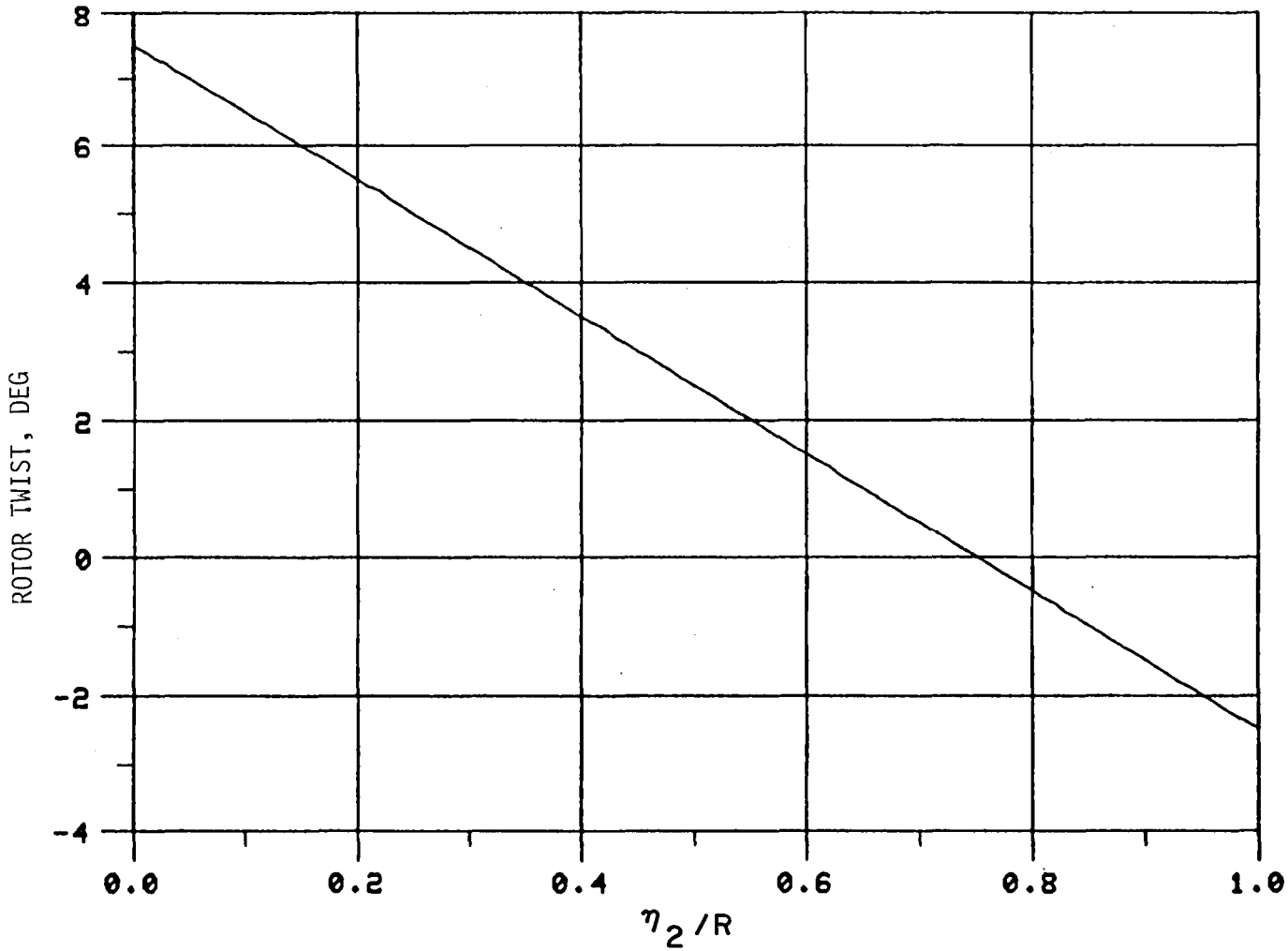

Figure A-8(c) - S-76 main rotor characteristics. Blade twist vs. nondimensional rotor radius.

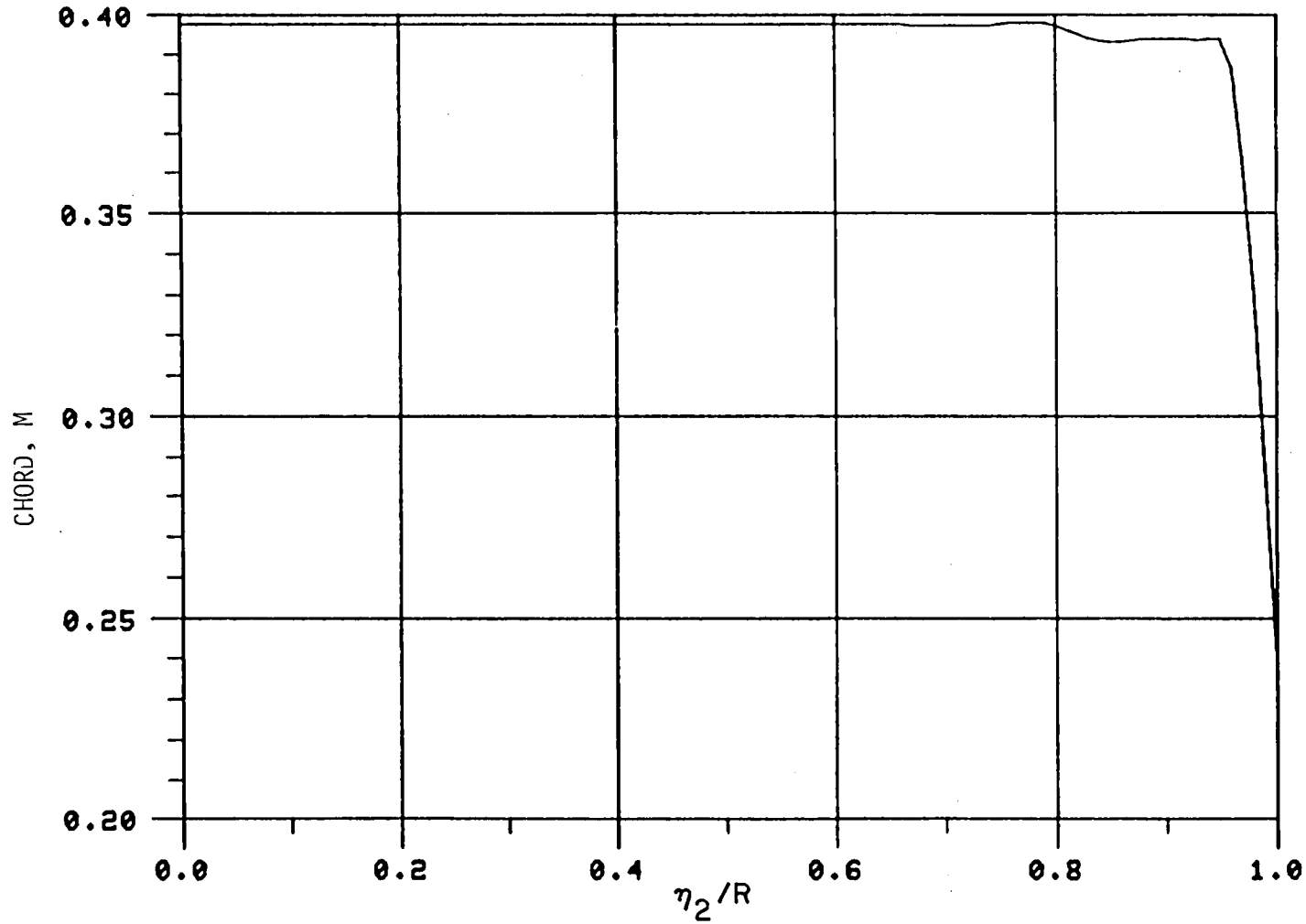

Figure A-8(d) - S-76 main rotor characteristics. Chord vs. nondimensional rotor radius.

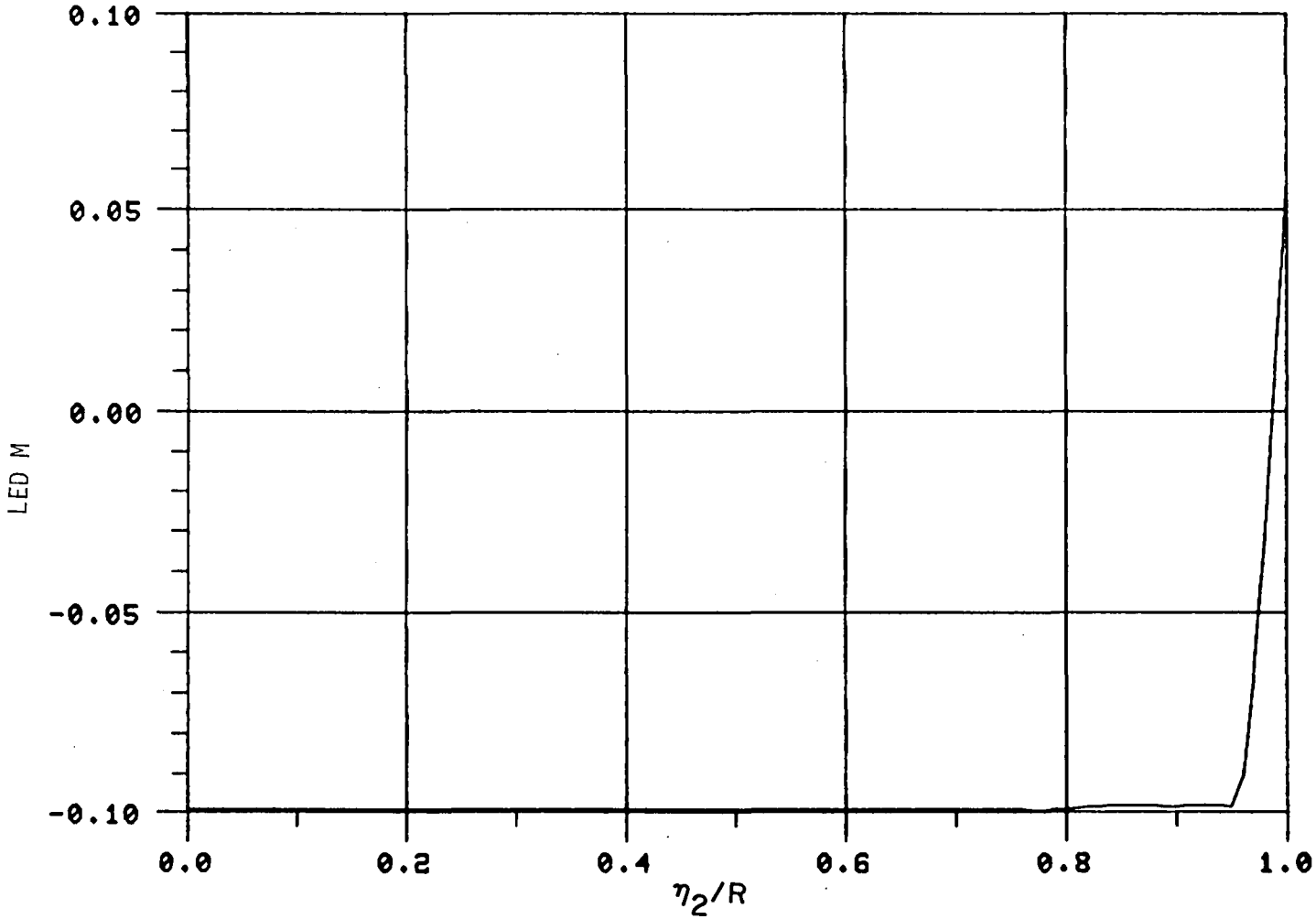

Figure A-8(e) - S-76 main rotor characteristics. Leading edge displacement vs. nondimensional rotor radius.

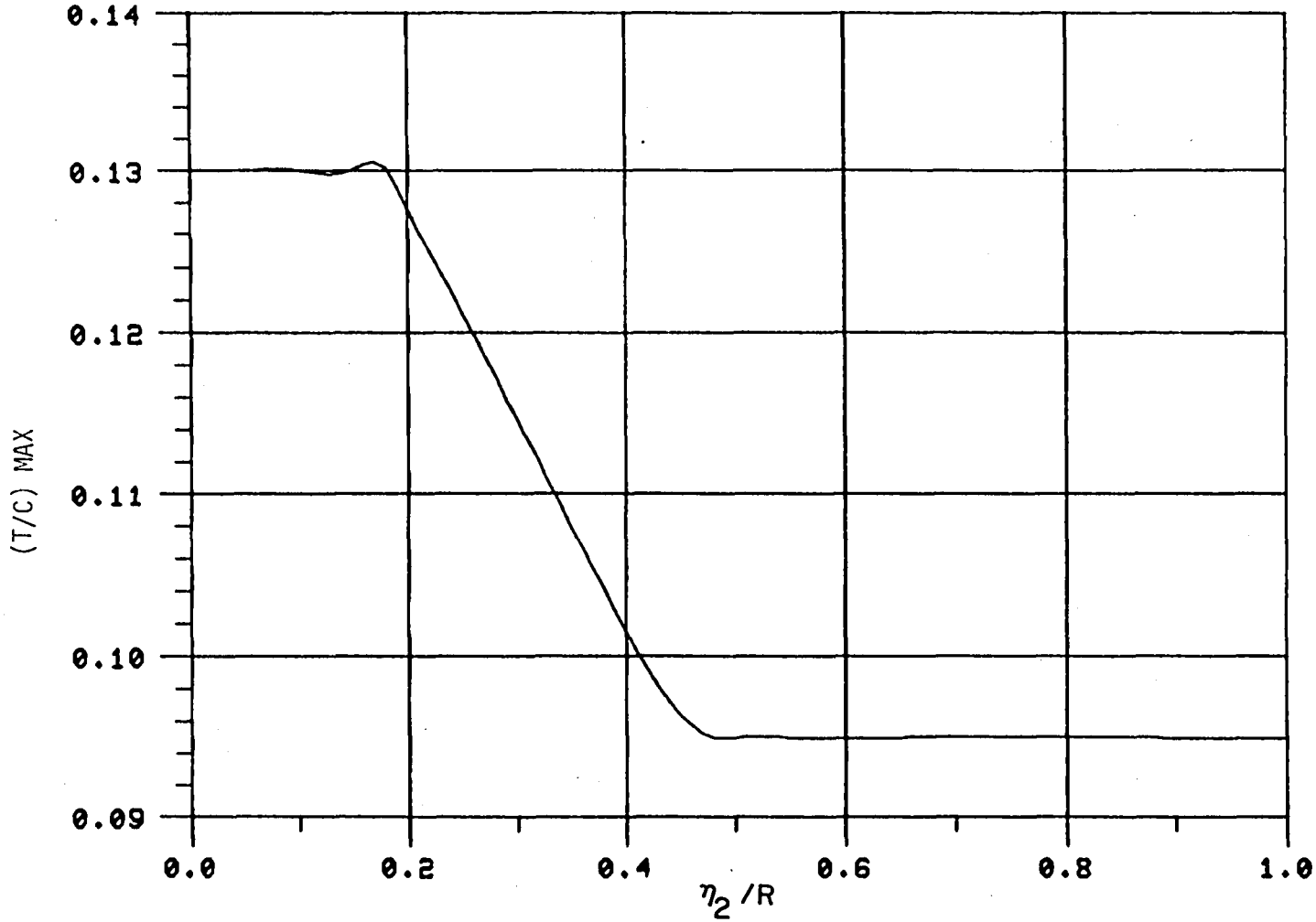

Figure A-8(f) - S-76 main rotor characteristics. Rotor maximum thickness/chord ratio vs. nondimensional rotor radius.

```
 $INPUT AA0=9.17, AAC=1.89, AAS=-4.44, ALPHAR=3.15,
 C=350.3, CENTER=.TRUE., DOQUAD=0.05, EPSLON=0.5, FULL=.TRUE.,
 MOTION=.FALSE., NBLADE=4,
 NLE=5, NPTS=72, NSPAN=20, NSPEC=36, NTE=10,
 CBS=609.6,0.,-152.4,
 PLOTS=.TRUE.,
 PSI0=4.361, PSIC=0.385, PSIS=-0.653,
 R=6.7056, REV=292.99, RHO=1.1452, RINNER=1.2204
 SAVE=.FALSE., TZERO=0., VH=51.48,0.,0.  $END
S76FV1
3,1,20.,0.0,0.0
13,4,0.,.006,.008,.012,.026,.05,.06,.07,.10,.14,.17,.25,.29
7,17,.39,.49,.59,.69,.77,.87,1.0
10,24,0.,.1121,.1318,.1655,.2519,.3428,.3680,.3882,.4279,.4573
-10,34,.4745,.4984,.4980,.4756,.4415,.3919,.3146,.2341,.1323,0.0
3,1,20.,0.,0.
13,4,0.,.006,.008,.012,.026,.05,.06,.07,.10,.14,.17,.25,.29
7,17,.39,.49,.55,.65,.71,.81,1.0
5,24,0.0,.00998,.0122,.0163,.0284
5,29,.0439,.0491,.0536,.0643,.0740
5,34,.0791,.0855,.0847,.0804,.0732
-5,39,.0674,.05415,.04352,.02688,0.
2,1,1.,-10.
-1,24,0.
3,1,19.,0.,0.
12,4,0.,.182,.20,.22,.316,.38,.4,.48,.5,.55,.65,.75
7,16,.795,.833,.892,.90,.95,.951,1.0
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3,1,19.,0.,0.
12,4,0.,.182,.20,.22,.316,.38,.4,.48,.5,.55,.65,.75
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8,24,-.09938,-.09938,-.09938,-.09938,-.09938,-.09938,-.09938,-.09938
4,32,-.09938,-.09938,-.09938,-.09938
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4,18,.892,.90,.95,1.0
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-6,36,.095,.095,.095,.095,.095,.095
```

Figure A-8(g) - Farassat/Nystrom analysis rotor characteristics and operating conditions input data for S-76 main rotor.

APPENDIX B
TECHNICAL DESCRIPTION OF THE CHORDWISE PRESSURE PREDICTION METHODOLOGY

The intent of this activity was to provide a preliminary rotor blade chordwise pressure distribution prediction methodology. This was used in an acoustic analysis which uses existing rotor airload, wake, and two-dimensional airfoil chordwise loading prediction analyses. These were employed in a manner that was reasonably theoretically consistent and significantly less costly to implement than the development of a rigorous three-dimensional unsteady flow analysis. In addition, the complexity of the methodology could be varied by selecting different levels of sophistication of the separate existing analyses used to define the methodology. These levels of sophistication will be defined in the following technical description sections for each of the three separate portions of the combined methodology; airloads, wake and two-dimensional airfoil chordwise pressure prediction analyses.

Airload Prediction Methodology - Normal Modes Aeroelastic Blade Response Analysis

Since accurate airloads prediction requires assessment of many interrelated dynamic and aerodynamic mechanisms, Sikorsky has developed a global analysis approach. The resultant program, identified as Y201, is documented in Reference 12. The Y201 aeroelastic rotor program contains state-of-the-art representations for all primary factors influencing rotor airloads prediction. The approach includes both dynamic and aerodynamic considerations required to accurately determine rotor blade motions and resultant airload distributions. These analytic models are integrated into a single analysis and can be selectively employed to vary the sophistication of the airloads prediction technique. The basic mathematical model in the Y201 airloads analysis represents each blade as a segmented dynamic and aerodynamic body. Mass, stiffness and damping properties are defined for each segment which, when combined with the appropriate end constraints at the rotor head, permit calculation of the blade response to imparted airloads. Since the airloads themselves are also functions of the blade dynamic response, an iterative technique is used to converge the airload and dynamic behavior. The rotor induced inflow logic can be exercised on several levels of complexity. As such, only the simplest constant inflow representation is addressed directly within the Y201 analysis. The more complicated wake induced inflow representations are accessed through a separate, more sophisticated wake methodology analysis (F389SR), which is computationally linked with Y201.

Rotor blade flatwise, edgewise, and torsional bending are calculated with a modal approach. The blade model will accept up to five flatwise elastic modes, five elastic edgewise modes, and ten torsion modes. These are in addition to the articulated flapping and lag modes. Also, the required mode shape may be calculated externally or internally. For the purpose of calculating airload distributions, three flatwise modes, two edgewise modes, and two torsional modes are usually sufficient.

Rotor trim is primarily accomplished through internal iteration on the governing rotor control inputs. An exception is rotor shaft angle setting which requires an external iteration. Rotor collective pitch and the rotor lateral and longitudinal cyclic pitch settings are internally controlled to obtain a specified lift and predetermined roll and pitch moment values.

The integrated aerodynamic analysis includes a full treatment of loads developed in a skewed unsteady flow field including the non-uniform inflow pattern resulting from a distorted trailing wake, if desired. This level of airload modeling complexity, while available, can also be simplified by the user to reduce computational time requirements and to study the impact of the various mechanisms on the resulting airloads. The skewed flow model is based on the method of Reference 13 which synthesizes skewed airfoil characteristics from two-dimensional non-skewed airfoil tables. Both the skewed lift and drag representations have been extended to permit modeling of blade configurations with swept tips.

As mentioned previously, the Y201 analysis uses either an internally calculated uniform downwash or a radial and azimuthally variable downwash generated with the linked F389SR analysis. In either case, the downwash plays an important role in the airload determination since the effective blade section lift angles are the sum of the local airfoil section geometric angle and the flow angle induced by the local downwash.

Wake Induced Velocity Methodology

The Single Rotor Prescribed Wake Rotor Inflow Analysis (F389SR) computes rotor induced inflow distributions for interface with the Y201 airload analysis. Since the inflow velocities are based on the evaluation of velocities induced by a representation of the wake structure, the method can describe radial and azimuthal inflow variations in great detail. Figure B-1 illustrates typical rotor inflows calculated with the prescribed wake analysis at high forward flight speed. For contrast, the corresponding airloads are also presented as calculated with uniform and variable inflow models. As indicated by the comparison, the use of representative wake induced downwash distributions has a strong effect on the predicted airloads as compared with the uniform inflow model.

The non-uniform downwash distributions presented in the middle portion of this figure were calculated with an assumed rigid, skewed helical wake. Although this is the simplest wake structure used in the analysis, more complex distorted wake shapes may also be used. These are similar to the rigid wakes, but have local distortions in the generally helical trajectories.

Two techniques are available for calculating the wake distortions. First, a "free wake" distortion program has been developed (Reference 14) which calculates the local wake transport velocities and deforms the wake in accordance with the Helmholtz criteria. This analysis, although accurate, requires large expenditures of computer time. Recently, a second wake distortion technique was developed. This procedure prescribes the forward

flight wake distortion pattern from a set of generalized equations. Since the wake distortion patterns are prescribed rather than calculated, the case running time is not appreciably greater than the rigid wake cases. The distortions do, however, increase the higher harmonic airload content above that of the rigid wake level. This is illustrated at the bottom of Figure B-1. The two analyses used in the wake methodology are described in the following sections.

Prescribed Wake Rotor Inflow Analysis

The Prescribed Wake Rotor Inflow Program (hereafter referred to as the rotor inflow program or inflow program) computes the circulation and inflow distributions along the rotor blades based on a prescribed wake model and a number of assumptions regarding the aerodynamics at each blade section. The section operating conditions are generally prescribed from blade motion and control information obtained from a separate blade response program. The wake model is either generated internally in the computer program (undistorted wake) or prescribed from a separate program. Descriptions and results pertaining to the development and application of the rotor inflow program in combination with wake geometry and blade response programs are presented in References 15 and 13.

Briefly, the mathematical model in the rotor inflow program consists of the representation of each blade by a segmented lifting line, and the helical wake of the rotor by discrete segmented vortex filaments consisting of trailing vorticity which result from the spanwise variation of bound circulation. The circulation of the wake for each blade changes with azimuth position and is periodic for each rotor revolution. The blades are divided into a finite number of radial segments, and the induced velocity at the center of each selected blade segment is computed by summing the contribution of each bound and trailing wake segment.

The analysis uses the known flight condition, wake geometry, lift-curve slope, and blade motion and control parameters to obtain the bound circulation values, which, when combined with the appropriate geometrical relations in the Biot-Savart law, produce the required induced velocity distribution.

Distorted Wake Geometry Analysis

This analysis predicts the distorted tip vortex geometry in forward flight for single rotors in steady flight. A detailed description of the development and fundamental concepts used in this analysis along with sample applications are presented in Reference 14. The basic technical approach and numerical procedure used in this analysis follows, and the major assumptions and approximations used in the analysis are noted.

The wake model used in the calculation of the wake distortions is composed of trailing and bound vortex filaments only. The trailing vortex filaments are divided into finite length straight vortex elements whose end points are free to convect at velocities equal to the vector sum of the free stream velocity and the velocities induced by the trailing and bound

vorticity. The length of the wake elements is related to the azimuth increment chosen. The wake is truncated at an arbitrary number of revolutions downstream of the blade. The accuracy of the analysis is increased by decreasing the azimuth increment and increasing the number of revolutions. The exact choice of these parameters is dependent upon the flight condition under study and the trade-off between required accuracy and acceptable computing cost.

The shed wake elements due to azimuthal variation in blade bound circulation have not been included in the wake model. This shed wake represents one of the unsteady effects arising from the azimuthal variation of blade bound circulation. Although it is recognized, from a theoretical viewpoint, that the Helmoholtz laws of vortex continuity have been violated as far as the wake geometry problem is concerned, the omission of the shed wake effects on the distortions of the trailing vortex filaments is expected to have only a secondary effect.

The circulation strengths assigned to the wake elements are assumed to be known in advance from a previous calculation. In such a calculation, a steady flight condition is assumed and the circulation of a given wake element is related to the bound circulation of the blade at the time the wake element was created. Viscous dissipation effects on wake circulation are neglected.

A provision is included in the analysis for eliminating the irrotationality assumption (i.e., applicability of the Biot-Savart law) in computing induced velocities at points located within an arbitrary distance from any vortex element. This distance is considered to be the vortex core radius. Due to the current limitations of the state-of-the-art concerning rotor vortex core size, two assumptions are made. First, the rotational induced effect for points within the core is neglected. Second, changes in core radius consistent with distortions of the lengths of the elements are neglected. The results presented herein were obtained assuming a vortex core size of 1 percent of the rotor radius. Finally, interference effects from sources external to the rotor blades such as the fuselage, hub, and wings are not included in the analysis.

Chordwise Pressure Distribution Methodology

The Farassat/Nystrom Acoustic Analysis requires blade airloads in the form of local blade differential pressures at numerous spanwise and chordwise coordinate locations representing the entire extent of each blade. However, the operational rotor airloads and wake inflow analyses predict only a spanwise load distribution. To provide a preliminary capability which can be used to help determine if a more rigorous analysis is required, several existing two-dimensional airfoil pressure prediction analyses were used. Thus several assumptions noted below were made which are independent of the particular airfoil analysis used. First, it was assumed that the three-dimensionality of the blade chordwise pressure loading in the blade tip region can be characterized by the two-dimensional simulation of the spanwise loading distribution at the tip. These distributions are based on either a prescribed parabolic tip loss for uniform inflow or the

wake induced velocities. It is recognized that in the tip region there are other mechanisms such as viscous and transonic compressibility influences which are not modeled by the two-dimensional chordwise airload prediction methodology which can further influence tip loading pressure distributions. The assumption of quasi-steady aerodynamics in the use of the existing chordwise pressure prediction methodology is another assumption which is known to be questionable over certain regions of the rotor disk. The assumption that the spanwise loading prediction is sufficiently accurate to allow the use of the corresponding section lift coefficient as the common parameter used to set the required pressure distribution level as defined by the particular chordwise pressure analysis also can be invalid.

Extended Theodorsen Analysis

To calculate the surface pressure distributions for arbitrary airfoil sections in a fully subsonic flow field, the method of Theodorsen (Reference 6) was programmed and modified to include the Karman-Tsien compressibility correction, an approximate second order correction on the local pressure distribution (Reference 16). Theodorsen's method was developed for inviscid, incompressible flow about airfoils of arbitrary shapes. The method consists of several steps involving transformationsof the airfoil shape to a near circle and finally to a perfect circle. This final transformation is analytically exact and can be evaluated by approximation to any degree of accuracy desired. The details of the transformation are well documented in Reference 6 and will not be described here. The Karman-Tsien compressibility correction is then applied to the solution obtained using Theodorsen method. The resulting surface pressure coefficient is then just:

$$C_P = C_{P_i} \left\{ \sqrt{1-M_\infty^2} + \frac{M_\infty^2}{1+\sqrt{1-M_\infty^2}} \frac{C_{P_i}}{2} \right\}^{-1}$$

where C_{P_i} is that obtained using the Theodorsen method and M the free-stream Mach number. Theordorsen obtained good correlation with this analysis when comparing it with unstalled, low Mach number test results. This incompressible analysis was used in Reference 17 to provide plots of surface velocity distributions for a wide range of airfoil shapes.

TRANDES Analysis

In order to more accurately predict the chordwise pressure distribution in high subsonic or transonic flow conditions another analysis which solves the steady irrotational, transonic flow over two-dimensional airfoil sections with weak viscous interaction was used in this investigation. This analysis is called TRANDES and was developed by Carlson as reported in Reference 9. A brief description of the direct solution procedure of the analysis follows.

The solution to the full, inviscid, perturbation-potential flow equations are obtained using a cartesian grid system. A coordinate transformation is made in the analysis which maps the infinite physical plane to a finite computational plane using a coordinate stretching procedure. This stretching is controlled by the user and allows for optimization of the solution procedure for different conditions. Because of this transformation, the boundary condition at infinity can be applied directly in the analysis. The governing partial differential equations are second order and are replaced by a system of non-conservative finite difference equations with rotated differencing at supersonic points in the flow field. The general solution procedure solves the resulting system of equation for a series of grids, starting with a course grid, and by grid halving, finishes with a fine grid. The effects of weak viscous interaction are also included as an option to the user. The Nash-MacDonald method is used in the analysis for the viscous interaction and the inviscid surface boundary is updated by the displacement thickness distribution. Iterations between the boundary layer analysis and the inviscid solution are performed to obtain the final solution. The pressure and viscous forces are integrated to obtain the airfoil lift and drag.

Chordwise Pressure Loading Prediction Control Analysis

To interface the predicted spanwise airloading results with the chordwise prediction methods described above, an analysis which can selectively choose any of the above analyses to be used for the prediction of chordwise pressure loading distributions was developed. The selection is actually controlled by the user for any number (or all) of the blade stations for any of the azimuth positions for which the spanwise airloading was calculated. In addition, the control analysis can interpolate the pressure distribution prediction from input pressure distribution data if so desired. The resulting pressure distribution solutions are output to a post processor program which can plot the resulting output for graphic preview before being used in the acoustic analysis, and which converts the pressure distribution output to an input format required by the acoustic analysis. This procedure is diagrammed in Figure B-2.

The control analysis operates in the following manner. The spanwise airloading data and other necessary information as calculated for the azimuthal and radial locations by the particlar airload methodology (variable or constant inflow, rigid or elastic blade, etc) is input to the analysis. The control input for the type of chordwise pressure prediction analysis to be used at each radial and azimuthal position is selected by the user. At each station for which a solution is desired, the control analysis will use the selected analysis in conjunction with other pertinent data to obtain a pressure distribution whose integrated section lift coefficient matches the spanwise value input to the analysis. Once the solution is obtained, it is output in punched card form for later use by the post processor. This procedure is repeated for all of the desired stations on the rotor disk.

Application of the Methodology

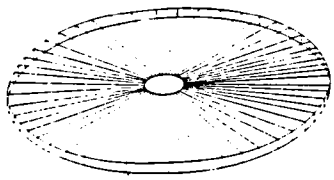
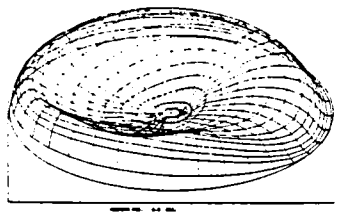
The application of the individual analyses which comprise the airloads and chordwise pressure prediction methodology used in this investigation described earlier, is an involved process in the sense that many separate, but sequential program executions are required to obtain the end product input for the acoustic analysis. The procedures required to obtain this input will be described in the following sections and the results of the application of the methodology will be shown for selected cases of interest.

Application Procedure

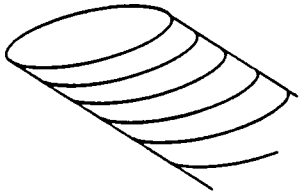
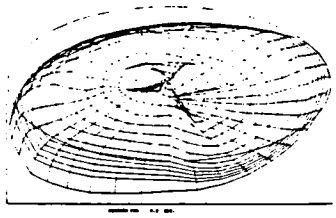
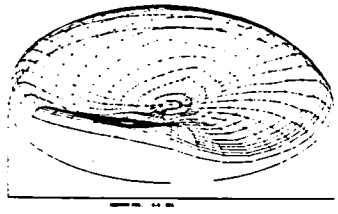
The general procedure starts with the application of the spanwise airloads analyses. For this application a variable inflow methodology is used. A constant inflow flexible blade response solution is obtained for the flight condition under investigation to provide starting blade response and rotor control input for the variable inflow analysis. Using these inputs the classical wake induced velocity solution is obtained using the Prescribed Wake Rotor Inflow analysis. With this induced inflow a flexible blade response solution it obtained which yields new rotor controls and blade response input for the inflow analysis. An iteration procedure is thus established between these two analyses and generally several cycles are required to obtain a consistent, converged variable induced inflow and blade response solution.

Once the blade response and induced inflow solutions are obtained for the prescribed wake geometry, the spanwise airloading from these solutions is output in a format compatible with the chordwise pressure prediction control analysis input requirements. The desired pressure prediction analysis is chosen for use and the resulting pressure distributions are obtained for all or selected points on the rotor disk. Once these desired solutions are obtained they are output in a format compatible with the acoustic analysis input requirements. The resulting acoustic predictions are then made using the acoustic analysis. Figure B-3 is an example (in graphical form) of the output of the pressure predictions provided by this methodology for use in the acoustic analysis.

CONSTANT INFLOW

WAKE MODEL	INFLOW DISTRIBUTION	AIRLOADS
NO WAKE		

VARIABLE INFLOW (CLASSICAL)

VARIABLE INFLOW (DISTORTED WAKE)

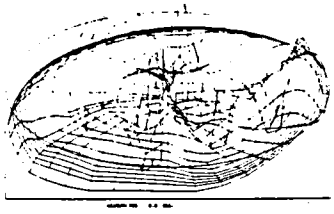
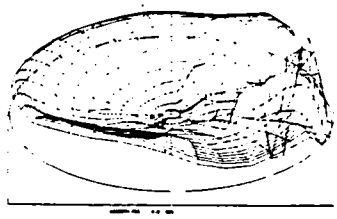




Figure B-1. - Wake model effects on predicted airloads.

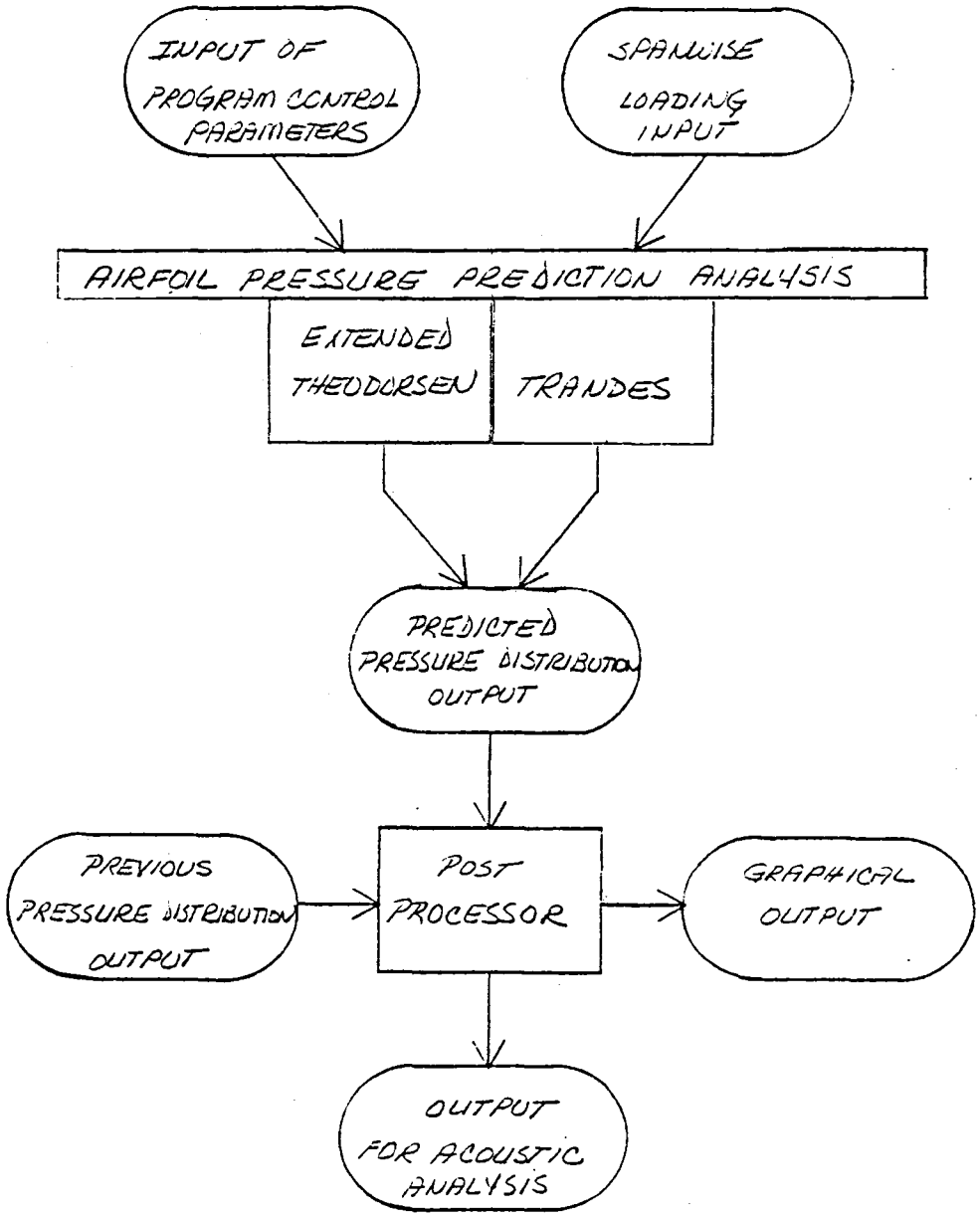


Figure B-2 - Diagram of chordwise pressure prediction control analysis and post processor.

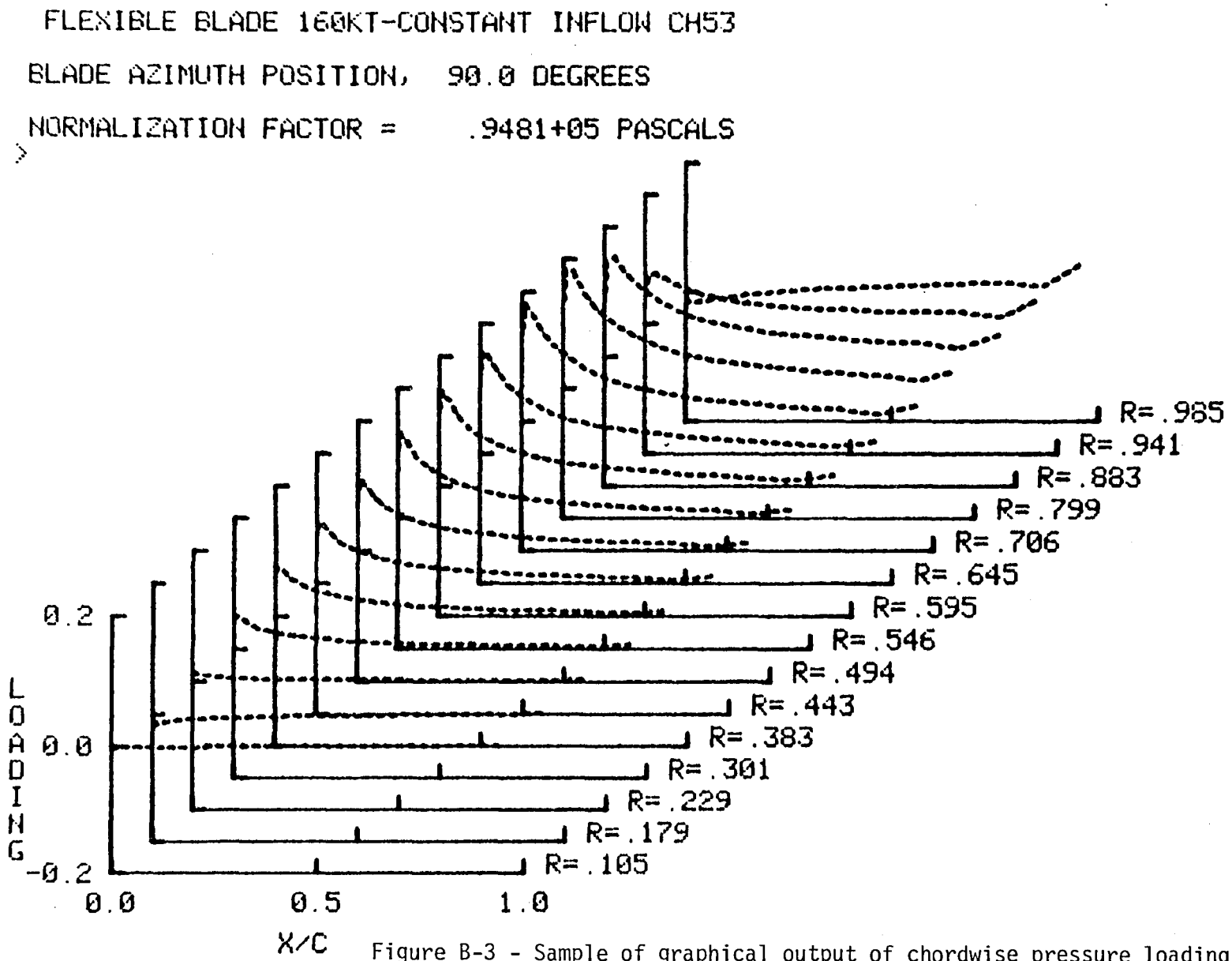


Figure B-3 - Sample of graphical output of chordwise pressure loading distributions from the post processor.

```
10   8 145   1
    0.2500      0.4000      0.5500      0.6500      0.7500
    0.8000      0.8500      0.9000      0.9500      0.9800
    0.0020      0.0100      0.0262      0.0420      0.1580
    0.3000      0.6000      0.9100
 4286.5391  13188.7305  16827.7891  28493.5859  46600.9492
54283.9531  67195.8750  66800.8750  66405.8750  56363.7930
 5369.0391  16519.3398  17946.0625  29128.9844  46425.5352
53182.6445  65062.5820  64263.6445  63464.7070  53888.4297
 4606.3125  14172.6094  14441.1602  22989.1523  36185.8320
41239.2109  50264.9687  49600.3203  48935.6719  41605.5937
 3986.3845  12265.2187  12207.6992  19287.8008  30209.9766
34336.0156  41769.4805  41149.8867  40530.2930  34436.3125
 1830.4661   5631.9375   5118.6992   7836.6523  12014.9180
 9689.4062   8297.2305  10859.5117  13421.7969   8092.4687
 1220.9697   3756.6528   3405.2864   5208.3477   7979.8477
 6627.2266   5912.9805   4734.8906   3556.8008     45.9226
  431.7048   1328.2600   1204.0256   1841.5454   2821.4795
-2183.1477  -7398.0703  -4440.6914  -1483.3086  -6087.0273
  252.0819    775.6001    125.6938   -134.2727   -554.7021
 -810.9512  -1145.3154  -2293.6609  -3442.0083  -6428.7148
 5139.8516  15705.9922  17969.7852  29113.0664  46830.0820
54010.4219  66569.5625  64682.0664  62794.5625  53223.3047
 5875.3633  17953.5078  18651.7891  29373.1289  46405.5156
52699.4023  64241.5234  62124.9492  60008.3750  50948.7266
 4825.6758  14745.9570  14786.8437  23024.2539  36105.9609
40814.7109  49588.1289  47942.4922  46296.8555  39380.7031
 4110.7852  12561.4375  12426.9648  19263.3633  30118.5820
33958.7773  41180.8672  39755.5469  38330.2305  32585.5625
 1905.2827   5822.0234   5221.8437   7816.3789  11931.0195
 9507.3477   8030.5000  10385.5937  12740.6953   7520.4531
 1270.3013   3881.6934   3469.6265   5186.7539   7909.7930
 6458.1641   5649.6953   4381.0859   3112.4766   -305.7222
  440.2886   1345.4021   1202.5796   1797.7400   2741.5496
-2276.6978  -7521.6797  -4616.8750  -1712.0664  -6150.7578
  244.2257    746.2869    106.0137   -162.6405   -595.2285
 -834.9275  -1157.7754  -2298.2903  -3438.8069  -6467.6211
 5534.4141  16444.9609  18821.9766  29601.5273  46986.2305
53762.3398  65347.7969  62343.4453  59339.0937  49734.2109
 6284.0703  18672.4883  19452.4961  29728.3516  46324.7109
52264.4687  62879.5742  59809.7305  56739.8867  47704.5352
 5147.1562  15294.2656  15397.8047  23266.6992  35983.5859
40435.4453  48504.4844  46158.6914  43812.9023  36927.6367
 4380.2578  13015.5039  12931.6875  19452.2187  29992.7500
33621.0391  40256.9219  38259.3672  36261.8164  30548.6680
 2196.3960   6526.3711   5631.5703   8028.4648  11917.0312
 9310.6328   7537.1289   9764.2734  11991.4258   6906.7148
 1318.8320   3918.7778   3587.5242   5237.5859   7909.9531
 6380.1914   5421.1797   4067.6201   2714.0586   -680.8896
  451.4429   1341.4177   1228.0281   1792.8542   2707.6179
-2353.9468  -7626.0820  -4742.4570  -1858.8242  -6233.0000
  243.2610    722.8257     99.9937   -170.5050   -597.6609
 -851.0764  -1180.6260  -2295.0393  -3409.4546  -6510.5195
 5983.9336  17197.1758  19981.5039  30206.4219  47121.4219
53807.3711  63826.7109  59687.6914  55548.6641  46616.6914
 6748.7695  19395.2227  20565.1680  30203.4570  46236.8984
52136.6523  61266.3008  57226.0156  53185.7305  44842.0859
 5512.5781  15842.5508  16254.3555  23604.5156  35860.9844
40301.1719  47238.0391  44177.3164  41116.5898  34775.7031
 4686.5352  13468.5859  13641.9727  19720.9023  29867.8008
33488.6016  39184.0391  36602.4531  34020.8672  28763.4102
 2139.7529   6149.4141   5719.1289   8005.0117  11850.8672
 9250.8203   7223.8672   9205.7852  11187.7070   6406.6055
 1400.2344   4024.1196   3779.9229   5311.6992   7886.1289
 6357.4219   5222.5664   3775.9993   2329.4297  -1007.4600
  465.9861   1339.1929   1257.9265   1767.6897   2624.4375
-2471.3062  -7720.1523  -4868.2891  -2016.4219  -6272.6445
  236.5014    679.6790     75.8613   -206.0813   -640.2852
 -894.7805  -1204.7083  -2340.1511  -3475.5957  -6515.5391
 6379.3828  17988.8828  21129.3594  30850.3477  47241.6289
53314.5781  62577.8633  57426.3867  52274.9023  44008.3516
 7146.2187  20151.2461  21660.5742  30721.4297  46149.1953
51508.9805  59951.0547  55053.5000  50155.9336  42491.4531
 5821.2227  16414.9609  17096.0625  23977.6875  35743.9961
39787.7695  46212.4414  42522.5820  38832.7187  33026.1328
 4943.9805  13941.2734  14339.1328  20019.3008  29748.6758
33042.4766  38313.5352  35218.7148  32123.8945  27313.0430
 2148.9614   6059.7422   5887.5508   8042.3008  11767.2031
 9011.6328   6795.3203   8646.0391  10496.7617   6020.8437
 1429.7075   4031.5564   3909.0193   5335.3164   7801.8477
 6214.7187   4999.4805   3481.0149   1962.5469  -1199.1936
  463.6067   1307.3003   1267.5657   1730.0671   2529.8811
-2557.7588  -7798.4570  -4961.3203  -2124.1758  -6251.8125
  239.5983    675.6306     66.7441   -229.8567   -675.8477
 -918.2461  -1215.5925  -2315.6746  -3415.7583  -6538.8867
 6516.3359  18743.7500  21571.2891  31199.0469  47071.6367
52880.2344  61243.0625  55251.6953  49260.3125  41535.1328
 7250.4102  20855.2617  22031.9570  30952.1719  45795.2305
50961.5156  58589.3516  52995.1875  47401.0078  40291.5039
 5890.0312  16942.2422  17366.5625  24129.3555  35426.8906
39344.1094  45161.7344  40964.7852  36767.8242  31398.8867
 4997.4414  14374.7656  14556.9961  20133.1523  29464.2695
32655.8828  37424.8477  33917.7344  30410.6211  25965.6133
 2334.2698   6714.3516   6170.2266   8202.2031  11660.4453
 8841.2656   6449.1445   8164.4102   9879.6797   5692.3555
 1403.9478   4038.3506   3931.1860   5353.6094   7748.4687
 6126.1211   4799.6797   3264.8879   1730.0937  -1354.0789
  441.4358   1269.7568   1236.0623   1683.3074   2436.3098
-2646.4629  -7857.0625  -5016.1094  -2175.1484  -6240.7344
  246.1565    708.0508     67.4013   -249.0930   -718.9001
 -947.3701  -1221.6006  -2322.8652  -3424.1316  -6562.4766
 7164.6328  19229.3555  21920.6992  31110.2109  46873.6484
52553.4687  60073.1016  53282.5469  46491.9805  38318.7187
 7918.2969  21252.1406  22300.6602  30750.4336  45433.5000
50542.4922  57420.9023  51163.2930  44905.6719  37883.2187
 6415.3242  17218.2695  17554.0156  23944.7422  35110.2930
39007.6289  44270.5586  39590.1836  34909.7969  29797.4297
 5437.7578  14594.5547  14704.2852  19966.2695  29181.7852
32359.8789  36670.8437  32770.7344  28870.6211  24701.4062
 2487.5234   6676.3320   6177.5391   8098.2383  11533.2773
 8599.3359   5966.4531   7693.3242   9420.1992   5377.3633
 1521.0286   4082.3306   4001.1086   5373.8047   7792.3984
 6086.0781   4592.8320   3034.8879   1476.9414  -1517.1399
  462.9211   1242.4470   1217.7273   1635.5059   2371.5972
-2728.2141  -7923.5391  -5083.5977  -2243.6523  -6227.8828
  259.5195    696.5320     50.5968   -275.2227   -761.3372
 -989.9492  -1253.2183  -2323.4067  -3393.5969  -6556.8594
 7686.1133  19524.9844  21891.8320  31232.8867  46609.8867
52448.2148  59118.3359  51725.5000  44332.6523  35119.8555
 8438.1562  21435.3906  22182.7695  30763.6211  45028.0820
```

Figure C-1-CH-53A Measured Data Base - 32.3m/sec (160 kt).

50361.0469	56492.7031	49756.1055	43019.4922	35617.3477
6818.4180	17320.7852	17437.0273	23929.6797	34766.5352
38862.4922	43574.7773	38552.8047	33530.8242	28371.3242
5773.7969	14667.1445	14596.2422	19941.0312	28878.2031
32224.0586	36080.9727	31904.7891	27728.5977	23606.6289
2611.9048	6635.0039	6135.6055	8130.7773	11512.9883
8562.0547	5746.9102	7370.5586	8994.2109	5165.1523
1603.9492	4074.5015	3979.6243	5396.3984	7772.8398
6078.8359	4481.2422	2891.6790	1302.1133	-1565.9446
469.4983	1192.6633	1164.8923	1579.6025	2275.2190
-2834.1936	-7988.5508	-5158.8516	-2329.1484	-6151.8906
279.6433	710.3760	39.6649	-304.9824	-815.5491
-1037.8257	-1276.5620	-2323.6033	-3370.6465	-6497.7148
7765.5586	19855.6328	21596.0898	31285.8047	46879.9961
52305.6172	58503.0742	50581.3789	42659.6719	33964.4766
8469.4453	21655.3867	21795.6172	30713.9609	45158.0469
50170.1953	55922.6680	48775.0937	41627.5039	34490.4609
6825.9531	17453.1680	17109.0898	23867.9023	34842.5586
38718.5352	43165.8555	37854.8047	32543.7461	27502.1992
5774.6250	14765.0469	14311.6016	19877.0664	28924.6523
32090.8672	35730.6211	31321.4492	26912.2656	22860.0117
2674.5286	6838.4570	6079.0664	8141.1953	11530.4727
8441.3008	5476.6953	7102.7227	8728.7539	5072.1719
1577.9023	4034.5122	3871.7942	5356.1211	7771.7539
5991.3789	4299.4180	2763.0930	1226.7656	-1599.6313
446.5898	1141.8784	1095.8254	1515.9312	2199.6216
-2914.0850	-8070.7930	-5215.6836	-2360.5664	-6070.0898
289.9897	741.4705	37.1089	-322.9993	-862.5818
-1095.8374	-1345.2637	-2371.0305	-3396.7991	-6440.0430
7926.6562	19623.9766	21863.0937	31401.2148	46952.5469
51835.6680	57858.7305	49503.8086	41148.8672	34281.1094
8589.3203	21264.5312	21968.1367	30725.1484	45116.4414
49691.3594	55359.0625	47887.5820	40416.0859	34233.9492
6905.0273	17094.7383	17218.7500	23853.9375	34792.5586
38360.5977	42772.2383	37238.7383	31705.2266	27084.0820
5836.0117	14448.1875	14392.0078	19852.4375	28867.6680
31781.8555	35394.9766	30807.6094	26220.2305	22404.4766
2591.1311	6414.8477	5961.4766	7993.2930	11384.1445
8208.1758	5212.7227	6867.5625	8522.4062	5052.6680
1602.5937	3967.5317	3906.4983	5364.1641	7774.6602
5898.4531	4151.9648	2637.4075	1122.8477	-1564.3694
438.8208	1086.3865	1069.6746	1468.8127	2128.8518
-2996.3806	-8187.5078	-5293.1719	-2398.8320	-5988.8789
311.7339	771.7578	33.2272	-349.0576	-917.8872
-1152.8308	-1413.1272	-2392.8960	-3372.6663	-6367.2031
8381.4414	19523.1133	22173.8906	31721.5781	46841.6016
51800.5234	57279.2187	48571.0156	39862.7969	33515.0820
9024.6562	21021.3789	22196.7734	30953.5547	44919.1211
49655.7891	54890.7070	47169.1680	39447.6133	33806.4414
7237.1172	16857.6133	17376.3516	24013.9844	34628.9375
38353.3594	42462.6250	36763.9570	31065.2734	26880.8633
6111.0547	14234.6484	14513.5039	19973.8984	28717.7461
31764.8477	35130.6875	30412.1562	25693.6172	22240.9648
2800.1438	6522.4492	6094.7617	8092.6523	11333.2773
8088.0234	4923.9297	6691.6523	8459.3828	5124.8672
1688.1375	3932.2234	3953.2739	5410.8594	7749.1016
5855.9219	4021.5117	2538.4465	1055.3789	-1539.0547
447.3218	1041.9590	1047.5371	1433.7686	2053.3545
-3098.0750	-8280.5937	-5357.9375	-2435.2773	-5935.9883
334.4302	778.9973	19.6817	-384.4734	-973.9812

-1213.7385	-1465.6746	-2412.3240	-3358.9751	-6338.0000
8364.3867	19808.2383	21833.6172	31478.9258	46680.9375
51499.9922	56455.9766	47753.6484	39051.3047	32816.4297
8950.6484	21196.5977	21793.3320	30654.1602	44694.9297
49392.4570	54221.3125	46597.6953	38974.0664	33474.9766
7160.6211	16957.5195	17045.0352	23771.2461	34451.2695
38178.7383	42007.7227	36416.3203	30824.9023	26766.3555
6041.0312	14306.1484	14228.4844	19762.1484	28557.5234
31610.7227	34747.9727	30123.3437	25498.7070	22151.8242
2976.9417	7049.8828	6166.7266	8107.9805	11244.3828
7908.2695	4593.1875	6490.5742	8387.9648	5141.5156
1703.5630	4034.3149	3896.2007	5348.6172	7664.1445
5745.7227	3842.5820	2445.5422	1048.5000	-1523.9368
433.9285	1027.6138	992.4341	1362.3918	1952.1980
-3203.0320	-8366.7773	-5417.3789	-2467.9766	-5872.4570
320.1990	758.2837	-3.6834	-415.1104	-1023.3760
-1264.5627	-1509.1118	-2461.4248	-3413.7393	-6311.2109
8623.0039	20259.2266	21900.8320	31734.2031	46367.8242
50341.1484	55328.2500	46683.7500	38039.2344	32248.5469
9172.0078	21549.0703	21810.6875	30856.8984	44345.9961
48331.0156	53289.3320	45807.7930	38326.2383	33306.4844
7320.7812	17199.7305	17046.9219	23923.0352	34183.8164
37394.6914	41358.6328	35908.0391	30457.4336	26796.0742
6170.7656	14497.8359	14222.9102	19879.7539	28324.3125
30953.6758	34206.3906	29703.0078	25199.6133	22182.8477
2851.7119	6699.9219	5964.9922	8000.5117	11052.8555
7570.2539	4240.1094	6238.6836	8237.2656	5209.5273
1748.0371	4106.9062	3905.7720	5390.8906	7610.6641
5600.5937	3703.3164	2342.9072	982.4961	-1473.4072
426.5435	1002.1379	953.0588	1315.4475	1857.1003
-3257.4983	-8437.6992	-5454.8359	-2471.9687	-5851.5742
327.4949	769.4292	-19.4409	-456.3210	-1091.0437
-1305.1826	-1545.6057	-2477.0125	-3408.4207	-6312.8359
9162.7070	20782.7656	21634.3945	32289.7227	46249.5117
50352.0273	54054.6094	45674.5977	37294.5664	31724.7773
9689.3477	21977.2891	21502.0117	31362.1172	44204.2500
48416.3281	52243.8437	45108.1875	37972.5195	33214.9844
7716.5781	17502.6680	16796.0469	24312.9219	34082.4922
37504.9219	40629.4531	35482.0352	30334.6094	26903.5742
6498.8906	14740.7266	14006.9062	20195.7031	28230.0586
31038.4922	33600.3945	29352.1641	25103.9219	22278.8945
2965.0496	6725.2969	5820.3164	8060.5273	10930.4258
7450.4922	3911.3906	6038.6133	8165.8437	5252.6172
1802.9016	4089.3240	3788.6252	5406.1289	7499.4570
5563.3008	3582.9570	2222.1553	861.3516	-1525.6094
415.2812	941.9373	872.6741	1245.2515	1727.4294
-3400.6462	-8501.7148	-5503.3672	-2505.0117	-5882.2578
340.1096	771.4336	-33.0092	-492.8743	-1141.4241
-1361.1584	-1570.0813	-2477.7261	-3385.3723	-6351.6914
9395.7734	21148.5742	21495.4531	32457.0391	45579.3555
48825.2930	52938.2930	44675.4492	36412.5898	31067.8867
9880.0859	22238.6914	21329.1445	31503.0977	43555.0625
47047.0156	51374.4570	44438.9297	37503.3867	33013.8984
7851.7773	17673.2578	16653.9141	24424.4805	33595.8125
36496.2539	40044.8125	35088.1016	30131.3828	26938.5820
6607.3711	14872.2695	13882.4180	20281.2695	27818.0391
30198.5430	33115.3320	29028.8398	24942.3437	22315.3320
3213.2842	7232.6523	5904.6367	8117.8281	10622.5820
7050.6758	3603.9805	5832.4570	8060.9414	5222.0352
1827.1748	4112.7148	3738.1360	5400.5937	7346.5430

Figure C-1-Continued.

5350.6211	3449.7227	2101.1143	752.5039	-1624.8462
412.2397	927.8940	843.3831	1218.4607	1657.4978
-3422.2520	-8562.7734	-5545.6641	-2528.5508	-5941.1094
352.8364	794.1855	-29.4353	-505.8872	-1159.9429
-1360.3206	-1584.8557	-2487.2314	-3389.6086	-6397.9844
9566.9336	21179.3516	22100.8281	32545.3242	44882.4180
48588.9570	51488.8359	43419.8516	35350.8516	30061.5977
10005.8594	22151.0469	21893.0508	31572.7852	42899.3828
46940.4766	50202.2773	43534.7812	36867.2734	32462.6562
7935.6484	17568.0000	17087.1602	24482.9258	33109.6211
36472.8242	39230.5117	34517.3516	29804.1797	26701.6484
6672.7305	14772.1406	14237.0430	20322.6523	27407.6953
30175.2578	32441.8594	28560.2344	24678.6094	22126.7187
3170.0950	7017.9805	5986.5234	8086.3242	10449.3750
6981.4531	3397.6328	5621.9258	7846.2227	5129.0039
1866.7446	4132.6133	3858.6953	5434.7109	7256.5156
5342.6602	3340.1094	1959.3879	578.6641	-1724.1792
408.7566	904.9087	844.9299	1190.0266	1588.9426
-3536.9641	-8604.1484	-5584.0078	-2563.8633	-5970.4609
371.5579	822.5576	-33.3168	-535.5381	-1206.9739
-1404.4456	-1578.6013	-2541.7979	-3504.9961	-6435.2187
9720.7930	21069.6406	22632.4102	31672.5430	44087.6055
47704.2656	50055.8125	41962.3242	33868.8203	28834.9922
10114.3398	21922.6406	22387.0937	30720.5352	42167.9023
46228.1797	49062.4883	42430.9727	35799.4414	31681.3945
8006.2734	17353.4531	17467.3203	23829.5156	32569.7539
35985.2539	38446.4258	33790.4414	29134.4453	26285.7891
6727.0742	14580.8125	14547.4180	19773.9141	26954.3125
29769.1328	31794.4805	27963.0039	24131.5273	21789.3711
3195.4519	6926.0820	6115.0430	7863.3828	10267.6484
6749.7656	3052.8867	5302.5430	7552.2070	4966.7812
1875.2878	4064.6511	3915.4089	5243.1562	7067.6953
5214.4805	3222.9883	1806.7688	390.5469	-1843.6074
397.3320	861.2100	829.5891	1110.9104	1497.4893
-3630.2771	-8661.7656	-5667.9258	-2674.0820	-5994.8867
387.9219	840.8137	-31.6559	-534.1843	-1222.0437
-1423.7571	-1587.7126	-2554.2334	-3520.7556	-6474.9609
9593.4023	21207.5586	23134.1484	31670.6172	43242.1602
47045.2422	48642.3789	40254.3242	31866.2500	27169.7070
9932.7773	21957.8008	22863.0430	30728.7109	41403.7187
45751.3242	47953.6602	41061.8828	34170.0937	30409.2617
7848.2930	17349.7500	17836.6719	23847.7695	32008.8320
35686.2891	37690.4297	32849.0508	28007.6641	25466.6914
6589.6172	14567.2734	14849.7383	19783.9766	26484.7383
29520.1641	31171.3984	27188.4961	23205.5937	21117.1211
3249.2729	7182.9727	6318.8125	7855.8906	9957.2383
6407.3164	2556.9570	4834.9297	7112.9102	4714.1875
1862.0457	4116.3125	4015.5059	5248.5117	6925.4687
5102.7031	3040.6797	1580.9172	121.1523	-2032.0789
383.2170	847.1553	826.4092	1080.1675	1425.2925
-3746.4568	-8742.5391	-5757.0703	-2771.5937	-6067.4297
393.8716	870.7083	-27.1716	-549.0132	-1244.9448
-1467.8057	-1621.8416	-2583.8809	-3545.9219	-6517.0195
9694.2070	21681.1055	24099.7852	31335.0937	42311.3906
46092.0977	47042.9922	38420.8516	29798.6953	25931.2773
9990.4102	22343.5625	23809.8750	30428.5234	40571.3711
45001.4297	46668.6367	39556.1562	32443.6602	29155.1484
7880.3437	17624.3945	18576.7578	23630.7695	31398.7344
35178.4687	36798.4297	31797.0078	26795.5742	24439.1719
6612.0469	14787.8477	15461.8398	19600.3203	25975.6055

29099.4023	30436.6523	26322.4180	22208.1719	20183.3672
3151.8040	7049.0117	6458.8867	7687.6367	9688.5898
6156.3828	2246.2070	4451.5430	6656.8828	4375.7031
1863.5908	4167.9219	4163.4570	5171.1680	6746.5977
4968.1094	2884.6094	1365.4856	-153.6404	-2252.5151
372.8081	833.7859	832.8931	1034.4846	1349.6462
-3865.0798	-8842.5078	-5826.1133	-2809.7109	-6111.0156
399.1819	892.7705	-21.5036	-551.1802	-1253.9080
-1493.9541	-1642.2798	-2608.8005	-3575.3228	-6555.1875
9957.2578	22095.3633	24301.0898	30886.3984	40888.3086
45066.8984	45196.6289	36283.0508	27369.4531	18392.5352
10216.4180	22670.4414	24009.4375	30028.6055	39277.2461
44193.2109	45138.8203	37709.7305	30280.6289	23852.6602
8045.7227	17853.6250	18735.9570	23338.8203	30433.5586
34628.9570	35713.2578	30462.2422	25211.2148	21892.7344
6746.4687	14970.5547	15591.1289	19355.5117	25173.7500
28645.0000	29542.7578	25222.0195	20901.2734	18832.5000
3222.4875	7150.7656	6569.0664	7666.3281	9482.3242
5912.9375	1812.3359	3881.0139	5949.6953	3905.5330
1839.8772	4082.7251	4165.0586	5122.3164	6613.7344
4842.2891	2635.8164	1016.7571	-602.3047	-2499.8879
356.2917	790.6189	806.5635	991.9360	1280.7485
-4021.3577	-8962.1797	-5944.6523	-2927.1172	-6177.8477
422.9226	938.4739	-9.2543	-560.6897	-1278.0886
-1543.5833	-1670.4011	-2605.0088	-3539.6182	-6581.9766
9652.3164	22048.3359	24281.7734	30045.5742	39796.5039
44135.0820	43169.3008	33998.6016	24827.8828	13035.1211
9862.6250	22528.7344	23984.5273	29244.9805	38308.9258
43477.2891	43420.3516	35588.7852	27757.2031	18979.1445
7755.5234	17715.5820	18719.2227	22748.3867	29722.2461
34151.3398	34475.9648	28848.3906	23220.8008	18963.6211
6499.1953	14845.8125	15572.9492	18862.7109	24582.8594
28250.8008	28523.4336	23873.1406	19222.8398	17031.9922
3243.5916	7409.1836	6665.8164	7465.6484	9116.2695
5625.0312	1457.7578	3278.4595	5099.1641	3275.7449
1760.8081	4022.1311	4142.0898	4974.7344	6440.6211
4663.1523	2325.2500	634.4407	-1056.3711	-2839.7998
330.2854	754.4558	776.9575	933.1423	1208.1072
-4200.1055	-9103.5312	-6112.7891	-3122.0430	-6203.5039
436.5225	997.1277	12.8058	-552.6089	-1293.0115
-1599.2822	-1713.3442	-2671.1243	-3628.9058	-6572.9648
9404.3203	21975.8242	24648.6484	30462.3320	38844.4727
42700.0664	40794.7852	31681.3555	22967.9062	9092.5937
9572.1523	22368.0039	24344.7148	29690.8984	37481.2852
42259.3359	41335.9766	33343.3398	25350.6914	14533.7734
7516.7031	17564.8789	19004.3437	23115.9062	29121.0430
33276.3320	32942.1523	26977.9570	21013.7461	15648.1875
6295.4922	14711.1797	15806.0859	19164.6523	24083.8320
27528.2930	27258.7773	22255.0820	17251.3789	14660.6875
2996.5964	7002.3828	6583.6797	7460.5039	8865.2500
5211.3945	854.4492	2445.9031	4037.3594	2469.7490
1658.7991	3876.2466	4121.1445	4972.6094	6225.3125
4403.8750	1988.2891	148.0562	-1692.1797	-3221.6218
297.8064	695.9077	739.8750	892.7395	1117.6389
-4360.7266	-9250.7656	-6282.0469	-3313.3242	-6229.1133
451.8525	1055.8799	29.4210	-578.2002	-1326.5002
-1639.1377	-1730.6313	-2720.1753	-3709.7209	-6545.3867
9358.2500	20971.7461	24564.8398	29751.1328	37716.4453
41627.9609	38301.4453	29143.3711	19985.2773	6299.3984
9491.0820	21269.4219	24253.5937	29034.8516	36487.3633

Figure C-1-Continued.

41395.3047	39105.6680	30421.3320	21736.9805	10802.2500
7443.5430	16680.9102	18937.1875	22625.9687	28390.9609
32677.8320	31282.8789	24554.1289	17825.3633	12309.2031
6230.9219	13963.4336	15744.8125	18754.8047	23478.8320
27034.8750	25890.2539	20192.7422	14495.2148	11941.2070
2876.7019	6446.6602	6390.9766	7143.7383	8491.9492
4744.3711	171.8672	1454.7859	2737.7068	1514.0310
1622.0215	3634.9341	4079.8052	4849.6797	6061.5547
4224.4141	1652.7578	-339.3208	-2331.4023	-3677.6611
272.6926	611.1018	685.8931	815.3250	1019.0635
-4582.4453	-9387.1914	-6435.4102	-3483.6250	-6238.9141
490.5278	1099.2683	41.7998	-589.9382	-1353.9314
-1699.6736	-1749.8867	-2722.3916	-3694.8982	-6498.4023
8778.7461	19652.3437	24174.8086	29676.0000	36534.8594
40393.7187	35858.0937	26128.9023	16399.6953	4087.1094
8873.8477	19865.2344	23863.0391	29002.3516	35441.9141
40362.5469	36895.1758	27216.3125	17537.4297	7434.8750
6951.3359	15561.4531	18637.8633	22623.1367	27620.0156
31943.1992	29628.0586	21914.8672	14201.6602	8803.1484
5816.0391	13019.9414	15490.4609	18748.8555	22840.6289
26429.0586	24525.0898	17974.6055	11424.1094	8765.5430
2829.8511	6334.9805	6381.2969	7117.5430	8113.9805
4233.3984	-526.9531	386.8450	1300.6445	459.7358
1550.3838	3470.7312	4021.9707	4811.7031	5810.1016
3953.9019	1276.0156	-847.5627	-2971.1445	-4136.8984
243.0367	544.0684	630.4802	754.2783	910.7859
-4808.7891	-9529.0234	-6583.7930	-3638.5586	-6224.8789
512.2532	1146.7439	58.1576	-614.5415	-1378.0625
-1767.2573	-1789.1873	-2745.7849	-3702.3840	-6414.9766
8223.1797	18780.0430	23641.4609	28685.6719	35135.4609
37172.8281	30319.1367	18337.0039	6354.8516	2043.9883
8286.9766	18925.7500	23343.4102	28083.9219	34182.5430
38197.2578	33075.8906	21117.4141	9158.9180	4345.7266
6484.6914	14809.6992	18239.8711	21930.3711	26680.3828
30705.9219	27387.1680	18233.0117	9078.8359	5211.3437
5423.1602	12385.3789	15156.0430	18172.6367	22063.4180
25556.3242	22936.6250	15514.0547	8091.4727	5320.8789
2680.0632	6120.7109	6271.3242	6894.3750	7801.7031
3850.3674	-1021.9102	-650.0825	-278.2539	-670.8384
1490.6948	3404.4392	3993.4797	4699.8086	5625.5117
3690.4387	872.6797	-1405.7795	-3684.2422	-4625.0000
219.0121	500.1785	586.7202	690.4937	826.4976
-5031.5352	-9686.1289	-6747.4219	-3808.7109	-6185.7266
507.6643	1159.4006	54.1820	-635.0874	-1407.9561
-1828.7478	-1812.1365	-2763.5383	-3714.9419	-6262.5547
7968.4062	18410.9766	23016.8906	28736.7187	33586.8008
32264.0156	21530.0469	12059.1797	2588.2930	959.8130
8007.9609	18502.3633	22742.5586	28190.6445	32772.0625
35112.9531	27211.6484	15756.4961	4301.3203	1665.9700
6260.3203	14464.4453	17779.1953	22038.2422	25619.7656
29368.3398	24550.3828	14665.0117	4779.6211	1935.3855
5233.3398	12091.6172	14771.3242	18261.1953	21186.4258
24902.5859	21354.8398	12960.0898	4565.3203	1880.7705
2534.5598	5856.0898	6024.3750	6842.1211	7407.9141
3369.4861	-1651.7969	-1775.1580	-1898.5195	-1751.4678
1433.4194	3311.9097	3876.3503	4701.2812	5374.7891
3454.4385	526.4531	-1951.2187	-4428.8945	-5050.6523
196.1374	453.1746	530.4082	643.2852	735.4424
-5345.3008	-9866.8711	-6911.2227	-3955.5703	-6099.3945
505.1011	1167.0342	39.4845	-694.3655	-1456.3179

-1931.8074	-1843.8030	-2693.8030	-3543.8042	-6069.6953
7214.0312	17973.3086	22295.6836	28054.1250	32313.1562
29100.7227	16107.0898	8401.3047	695.5078	-104.1243
7231.6562	18017.2266	22045.0195	27575.6797	31621.8984
32647.4180	22699.6445	11975.9219	1252.1836	-174.8618
5648.5469	14073.0078	17242.6992	21581.3516	24759.0937
28094.5820	21987.0586	11727.4531	1467.8320	-218.0703
4720.1562	11759.9766	14323.6602	17881.8125	20475.0508
24199.6719	19790.4219	10622.3711	1454.3008	-219.4397
2355.6025	5868.8359	5868.6484	6630.1250	6988.2227
2791.3638	-2343.7187	-2873.3862	-3403.0547	-2318.8521
1293.9619	3223.8252	3745.5129	4577.3750	5155.7891
3083.2566	-25.6055	-2547.1133	-5068.6250	-5331.6133
159.7225	397.9385	462.3340	565.0168	636.4143
-5663.8516	-10060.4180	-7102.0586	-4143.6953	-6001.3398
478.6770	1192.5940	48.7969	-703.0256	-1466.9551
-2011.7974	-1880.4441	-2763.6123	-3646.7822	-5901.1211
6615.8203	17581.0977	21755.3594	26981.1914	31140.8203
27119.3203	12497.4961	5999.8281	-497.8516	-435.5361
6617.0781	17584.4336	21526.6445	26573.4102	30562.5508
30789.1445	18980.9648	8974.8477	-1031.2891	-740.5430
5164.5273	13724.3828	16845.9102	20819.3984	23965.7344
26920.1289	19352.0664	9064.5742	-1222.9375	-928.9678
4314.2305	11464.7773	13992.4531	17249.9414	19819.4766
23431.3008	17884.3711	8322.4102	-1239.5703	-937.2200
2087.8005	5548.1875	5611.9219	6291.6641	6682.2383
2224.5767	-3102.6250	-3786.4485	-4470.2734	-2669.7700
1157.7742	3076.7061	3608.0808	4368.6133	4950.0820
2779.3845	-477.7109	-2996.7539	-5515.8008	-5542.0039
129.6390	344.5068	404.0063	489.1658	554.2739
-6014.1523	-10231.7969	-7257.3633	-4282.9219	-6007.6445
452.9465	1203.6750	43.7733	-716.4258	-1495.0767
-2119.6833	-1915.7546	-2774.3730	-3632.9932	-5822.4687
6125.7500	17028.9727	21539.1367	26928.0820	29711.9922
25854.7344	10233.3945	4213.4023	-1806.6016	-430.6689
6114.7383	16998.3555	21328.7422	26571.6523	29240.8008
29498.2383	16333.7773	7044.9258	-2243.9453	-737.3169
4769.2305	13257.9883	16699.4414	20839.4727	22962.1719
26002.4766	17211.4805	7188.1328	-2835.2305	-935.8318
3982.8208	11071.8398	13869.5078	17266.2695	18990.1602
22773.8750	16195.3242	6725.1211	-2745.0977	-949.5669
1889.0327	5251.3203	5468.1641	6197.5742	6305.4805
1486.2170	-4009.2891	-4562.1016	-5114.9219	-2531.0186
1092.5366	3037.1421	3599.3523	4368.1211	4709.8008
2463.8257	-903.2070	-3349.8496	-5796.4961	-5508.4141
96.4359	268.0820	317.7070	385.5652	415.7241
-6426.4609	-10344.5703	-7359.3281	-4374.0781	-5986.7617
435.4543	1210.5195	27.6497	-783.3811	-1546.7380
-2243.4006	-1919.3008	-2710.0054	-3500.7114	-5777.2109
5291.1602	16543.5391	20610.6523	25744.6133	28434.0547
24917.0664	8627.7969	3260.1133	-2107.5781	462.1741
5272.4883	16485.1641	20424.4531	25449.5898	28055.7266
28458.9414	14274.3437	5464.0078	-3346.3477	833.4961
4109.9023	12850.1758	15999.0469	19978.6484	22060.9961
25147.0742	15342.9727	5604.8008	-4133.3906	1009.6602
3431.2991	10728.4258	13286.7812	16552.8711	18245.4766
22088.6484	14609.3672	5245.3750	-4118.6328	995.3359
1645.2883	5144.2187	5232.1797	5888.0000	5958.8711
943.1936	-4555.9570	-5010.2656	-5464.5820	-1820.7661
933.2651	2917.9812	3436.4031	4182.9180	4527.8789

Figure C-1-Continued.

2249.1694	-1182.4453	-3492.6819	-5802.9219	-5306.4961
59.5845	186.2990	219.3978	267.0591	289.0833
-6847.1523	-10473.6055	-7456.2734	-4438.9375	-5974.7969
388.4709	1214.6079	20.2034	-796.2788	-1569.9827
-2377.6997	-1966.6277	-2751.4971	-3536.3679	-5760.9102
4312.9766	15584.2930	19375.8047	24448.3906	27468.5625
24308.7266	7211.4727	2352.4453	-2506.5937	2266.1038
4291.3516	15506.1445	19212.8984	24207.0352	27167.1172
27799.3242	12492.7812	4893.8164	-2705.1641	4587.1289
3343.4360	12080.9961	15058.0977	19020.9570	21388.1289
24519.9102	13593.1914	5026.6992	-3539.8125	5869.6562
2790.7554	10083.9687	12503.4844	15758.4883	17689.6016
21565.6328	13077.0000	4846.5742	-3383.8672	6112.8867
1418.7512	5126.4414	4978.9922	5523.0000	5562.9219
336.4744	-5082.8945	-4974.5547	-4866.2148	-237.9453
761.3726	2751.1035	3213.7600	3942.5806	4334.4336
1913.1882	-1604.9844	-3550.5396	-5496.0977	-4900.8867
27.1440	98.0806	114.5749	140.5584	154.5285
-7326.2852	-10606.5781	-7523.9687	-4441.3516	-6146.7187
339.0071	1224.9504	11.7284	-808.1802	-1604.0627
-2506.6135	-1971.9963	-2714.3149	-3456.6348	-5944.0625
3577.0298	14775.3008	18921.4766	24379.1914	26007.5039
22817.8828	4974.0977	2252.9238	-468.2539	6216.0859
3554.6748	14682.9609	18774.5195	24173.8711	25775.6289
26988.2539	10868.4102	4990.2617	-887.9023	11324.3047
2768.3286	11434.8750	14720.8984	19009.9922	20314.2344
23585.2422	11709.2734	5312.3594	-1084.5664	13885.7109
2310.2729	9542.8281	12222.6289	15749.2109	16801.9844
20848.4922	11505.6289	5203.2109	-1099.2227	13702.3633
1102.2244	4552.8555	4632.8398	5302.4453	5120.9102
-717.0266	-6094.4727	-4804.6641	-3514.8555	2149.3320
637.5127	2633.3145	3128.1160	3894.4785	4045.3867
1532.5598	-1964.5117	-3364.6316	-4764.7539	-4178.9570
-0.0401	-0.1657	-0.1969	-0.2451	-0.2546
-7821.3281	-10619.3750	-7462.5039	-4305.6250	-6326.8711
303.1001	1251.9871	8.5216	-876.8115	-1648.7307
-2657.1550	-1959.0940	-2701.0920	-3443.0916	-6191.0430
3238.0024	13794.0195	18073.4961	23093.1562	24280.6172
24548.8281	6186.0625	3988.6853	1791.3047	99999.8125
3214.5222	13693.9922	17943.3086	22927.2891	24106.6055
27264.4844	9730.3750	6374.3633	3018.3516	95202.6250
2502.5835	10661.1055	14074.4727	18041.8906	19015.8945
23546.9414	10207.3750	6814.4375	3421.5000	40677.1641
2088.1772	8895.7187	11685.2148	14947.0039	15728.5625
20373.4844	9556.2500	6402.3281	3248.4023	21849.4570
942.7161	4016.0083	4230.5430	4836.1328	4633.8984
-1501.0613	-6496.8164	-3506.7131	-516.6055	4742.4453
583.3369	2485.0386	3008.8435	3708.0635	3790.6797
1297.6479	-2180.2148	-2774.1558	-3368.0977	-3174.5891
-15.8051	-67.3302	-81.5223	-100.4671	-102.7056
-8662.4414	-10647.9453	-7381.0742	-4114.1953	-6449.7930
292.6770	1246.8164	9.6155	-884.2512	-1639.7195
-2884.8984	-1940.6260	-2718.1069	-3495.5894	-6548.5391
2897.4954	12809.8867	16763.0977	21924.3437	22857.2578
23544.4883	5042.5469	22270.3437	39498.1680	-38476.7695
2874.2637	12707.1797	16650.2344	21788.7695	22725.3164
25886.7109	7949.9766	17910.9727	27871.9883	99999.8125
2237.1123	9890.3203	13064.7969	17155.6836	17939.0273
22191.6797	8357.7227	12954.9727	17552.2344	90009.5000
1866.4436	8251.5859	10846.1836	14212.5273	14838.2852

19130.8437	7831.4297	9860.0898	11888.7539	28658.5195
924.9441	4089.1970	4049.9810	4569.7930	4196.5820
-2484.3462	-7140.4922	-1885.2266	3370.0508	7247.0234
538.4175	2380.3552	2832.5530	3546.8638	3574.5859
1104.3875	-2265.9062	-2015.7305	-1765.5547	-2178.3767
-32.5581	-143.9399	-171.2842	-214.4785	-216.1549
-9065.9180	-10526.8008	-7134.9609	-3743.1133	-6515.0508
280.9172	1241.9412	-3.2865	-914.3689	-1663.7517
-3012.5796	-1906.1021	-2684.5447	-3462.9888	-6769.8125
2502.4648	12255.4805	15734.6133	21275.9609	21209.6641
22634.5195	4215.6133	36321.3125	68427.0625	-40878.5000
2481.0640	12150.6719	15633.6836	21159.3984	21108.5312
24718.0586	6657.1758	26182.5234	45707.9062	99999.8750
1930.7302	9455.4883	12268.5508	16665.5312	16671.3086
21081.4727	7009.4414	17559.6875	28109.9492	99999.8125
1610.6904	7888.1367	10185.4922	13806.9453	13789.9297
18127.0859	6572.1641	12683.6562	18795.1602	36451.0547
856.7979	4196.0508	3915.8240	4423.3164	3750.2891
-3243.4319	-7393.6250	-169.6641	7054.3086	9561.7773
469.9641	2301.5857	2668.3372	3438.2793	3299.1445
1322.3042	-1813.8047	-851.7488	110.3086	-1020.8794
-49.6437	-243.1232	-281.8640	-363.1951	-348.4983
-9365.4766	-10171.7187	-6757.1250	-3342.5273	-6417.4375
252.2966	1235.5881	-26.3732	-990.9233	-1710.3899
-3169.5542	-1849.9600	-2649.0862	-3448.2139	-6735.0430
2237.9143	11795.9297	14983.2070	20647.5195	19191.3594
17518.8867	3871.1484	51935.4531	99999.8125	-43866.5000
2218.0864	11691.4180	14889.1055	20542.3672	19111.3945
20310.8984	7626.6172	36591.5039	65556.4375	99999.8750
1725.9094	9097.1797	11683.0781	16180.9102	15098.5469
17805.1523	8340.8125	24022.4766	39704.1680	99999.8750
1439.7515	7588.8555	9700.5039	13406.5117	12489.1367
15682.5430	8155.9453	17244.3672	26332.8047	43397.5195
716.5933	3777.1265	3512.3711	4024.6045	3149.6211
-2354.4500	-6249.1094	2310.2187	10869.5664	11364.9844
424.3618	2236.7900	2585.6785	3401.0571	3043.6914
1333.7910	-1287.8398	275.5457	1838.9336	-44.9739
-46.3231	-244.1668	-282.2512	-371.2576	-332.2478
-7857.8828	-10012.1602	-6445.9805	-2879.7930	-6225.6641
232.4526	1225.2456	-30.3024	-1048.5222	-1704.2825
-2664.1692	-1802.9277	-2684.3713	-3565.8164	-6646.8359
2209.4712	11626.4844	14426.6523	19872.2383	17505.5352
15058.1523	6757.3672	53378.5820	99999.8125	-45586.7500
2189.7200	11522.5508	14335.4922	19772.1641	17435.5391
17702.1250	11087.5508	49822.3633	88557.1875	99999.8750
1703.7932	8965.5508	11245.8164	15572.3398	13775.8359
15972.6055	11960.5117	32670.6367	53380.7969	99999.8750
1421.2844	7478.9570	9338.9023	12903.6172	11395.0352
14133.7656	11378.4297	23347.1445	35315.8828	46509.0508
638.5417	3360.0786	3193.1003	3739.7822	2825.5586
-1221.8496	-4794.3008	4476.6523	13747.6250	12197.2852
425.3596	2238.2903	2596.2825	3454.1233	2955.7852
1600.0015	-377.7344	1431.1470	3240.0312	520.3955
-45.8509	-241.2726	-279.8616	-372.3311	-318.6138
-6143.3477	-9580.0469	-5954.1797	-2328.3086	-6133.4727
228.5190	1202.4927	-36.4421	-1081.4180	-1686.7017
-2140.8088	-1762.7412	-2629.6572	-3496.5747	-6544.7930
1666.9143	11534.0352	13255.6328	19258.7461	16132.1641
14620.1094	10953.1953	55476.4727	99999.8125	-49474.8750
1652.2629	11432.6562	13169.9023	19157.3945	16063.5391

Figure C-1-Continued.

17289.1250	15966.4648	57983.1211	99999.8125	99999.8750
1285.6658	8896.0273	10328.0469	15083.8750	12690.1406
15432.1836	15899.6758	40077.5156	64255.3906	99999.8750
1072.5127	7421.1367	8578.1836	12500.2148	10496.9453
13461.7734	14442.4727	28549.0273	42655.6055	48396.7227
511.1582	3536.9050	3037.0569	3637.6143	2503.7227
-592.3000	-3601.0234	6358.9883	16319.0195	12870.5156
314.8899	2178.8481	2402.9351	3414.9143	2807.0508
1899.1750	711.3789	2634.9829	4558.5898	1210.2595
-35.2968	-244.2325	-269.3508	-382.7861	-314.6494
-5074.9570	-9087.2695	-5505.9102	-1924.5469	-5906.5859
173.5084	1200.5728	-35.6335	-1118.8508	-1685.4705
-1830.5154	-1705.7600	-2583.8313	-3461.9041	-6393.0117
1583.7173	11152.3672	12390.8242	18363.6484	14701.3633
19445.8711	24895.2578	62447.5117	99999.8125	-61199.5000
1570.3865	11058.4922	12308.0195	18258.2187	14628.9023
20595.6289	27308.9141	63654.3555	99999.8125	99999.8750
1222.1086	8605.9570	9648.8672	14370.1914	11552.7891
16791.8789	22639.6445	45129.8984	67620.1875	99999.8750
1019.5513	7179.5703	8015.2969	11909.9023	9556.0547
13909.1250	18766.3789	32029.6836	45293.0078	53335.3516
520.0735	3662.3018	3021.2544	3634.1375	2327.2695
413.7876	-1484.6953	7947.6172	17379.9492	13805.2539
303.1790	2134.9539	2402.3650	3584.8042	2886.7305
2409.3083	2019.2187	3635.1238	5251.0312	1664.6035
-19.6092	-138.0856	-155.3813	-231.8597	-186.7094
-4332.6602	-8635.6680	-5094.3086	-1552.9453	-5876.5898
164.7622	1160.2378	-46.7404	-1144.6531	-1658.5312
-1589.4878	-1578.0601	-2553.0759	-3528.0933	-6300.6211
1557.5771	10928.1602	11151.8516	17111.5430	14942.3906
21105.4844	34277.6250	67138.6875	99999.8750	-78484.1250
1545.4065	10842.7695	11074.8711	17001.6484	14852.5117
22450.0586	37503.1758	68751.5000	99999.8750	99999.8750
1202.9116	8439.7812	8681.6719	13377.2812	11722.9180
18341.1133	31050.3164	50159.7695	69269.2500	99999.8750
1003.6306	7041.6016	7211.5781	11086.4727	9696.5703
15193.8437	25736.9375	36385.3164	47033.7148	56419.7461
491.9670	3451.7041	2782.8171	3670.7180	2762.4258
1738.0757	1290.9336	9800.1133	18309.3086	13625.0000
311.8931	2188.2825	2381.0630	3773.4519	3383.7500
2943.2351	3480.1562	4556.3242	5632.5000	1580.4236
17.4029	122.1008	132.8575	210.5493	188.8049
-3368.6370	-8044.7930	-4684.9102	-1325.0234	-5912.9375
161.1066	1130.3442	-15.8608	-971.8894	-1549.1013
-1282.5537	-1441.9375	-2537.4888	-3633.0417	-6192.9141
1968.2061	10927.9219	10106.0625	15817.4414	17636.4336
26869.5000	43991.6406	71995.6875	99999.8750	99999.8750
1954.4673	10851.6406	10032.7578	15700.7070	17504.5273
28542.7930	47961.4180	73980.6250	99999.8750	99999.8750
1521.7388	8449.0352	7866.9414	12351.5859	13805.7695
23301.4570	39638.6133	55496.6055	71354.6250	99999.8750
1269.8057	7050.2461	6532.8164	10234.0898	11419.1055
19302.5820	32853.4258	41068.2031	49282.9961	54930.9805
593.1829	3293.4849	2681.2307	3932.0728	4153.4961
3375.9263	3589.5508	11383.2891	19177.0391	13251.6875
383.1394	2127.2764	2208.9053	3632.5132	4203.1875
3915.1255	4776.5703	5393.4023	6010.2383	1704.9414
66.3941	368.6348	382.7803	629.4768	728.3691
-3013.1431	-7639.3320	-4386.6484	-1133.9570	-5834.8789
206.5289	1146.6946	24.7458	-712.5347	-1450.0637

-1265.1270	-1451.6399	-2478.8350	-3506.0317	-6173.4648
2005.7422	10616.1328	9578.1953	14848.6992	21678.0859
35197.8437	51895.7266	75947.7500	99999.8750	99999.8750
1993.8948	10553.4258	9501.9844	14718.9219	21476.5898
37222.8242	56330.0195	78164.8750	99999.8750	99999.8750
1552.9951	8219.8008	7453.0352	11575.9961	16922.7695
30318.9453	46452.7187	58452.9727	70453.2500	99999.8750
1296.1008	6860.0937	6186.3203	9588.5937	13996.8164
25113.4805	38497.7227	44050.6484	49603.5898	52230.6953
587.9480	3111.9324	2604.5127	3917.2991	5594.4922
5118.8008	5105.3047	11727.3555	18349.4180	12940.4531
398.4033	2108.6980	2085.3586	3341.1753	4989.9258
4900.3984	5253.3477	5514.0898	5774.8359	1565.2500
85.6021	453.0806	448.0659	717.8945	1072.1494
-3080.5442	-7511.3867	-4236.8047	-962.2187	-5807.0508
211.2243	1117.9827	28.5398	-536.4988	-1383.8738
-1361.6980	-1462.4744	-2477.9729	-3493.4729	-6159.6250
2348.1943	10647.3789	9171.1172	15131.1055	27607.3320
40318.8398	54263.1172	77131.4375	99999.8750	99999.8750
2337.4041	10598.4531	9087.6758	14972.1875	27292.2148
42296.9961	58595.0273	77678.6875	96762.4375	99999.8750
1821.3538	8258.5352	7128.4844	11768.7500	21481.7148
34313.9687	48195.3867	57709.8711	67224.3750	99253.7500
1520.3752	6893.8125	5914.3125	9745.6367	17766.9023
28417.8750	39937.7383	44115.7539	48293.7773	50847.8164
771.5579	3498.4624	2633.8748	4150.2656	7341.1289
6421.7773	5698.7812	11655.6250	17612.4844	12543.0117
489.1331	2217.8687	1917.5251	3167.3425	5783.3125
5678.3516	5747.0195	5542.5117	5338.0039	1434.1321
112.4352	509.8130	440.7742	728.0652	1329.3884
-2956.4185	-7332.6172	-4161.1211	-989.6172	-5683.6875
240.8493	1092.0789	30.5401	-417.8821	-1316.8970
-1342.0815	-1408.3013	-2463.4932	-3518.6868	-6174.9883
2018.5520	10942.7070	9253.5859	15778.1797	34234.6406
43995.9023	56410.3555	78205.0625	99999.8750	99999.8750
2012.4265	10909.5000	9155.6602	15579.7109	33762.2383
45779.0078	60556.4961	75247.8125	89939.2500	99999.8750
1568.9519	8505.3945	7179.5898	12236.0195	26541.3359
36986.8828	49662.9414	57037.1875	64411.4492	84596.1250
1309.9949	7101.5703	5954.8281	10130.7148	21950.8516
30626.3789	41148.8437	44181.1211	47213.4102	47877.1641
682.7920	3701.4624	2584.8123	4161.3984	8703.0273
7498.6602	6746.5000	11719.2148	16691.9375	12126.3828
415.4746	2252.3167	1751.1777	2916.6948	6236.6914
6017.6562	6161.5195	5535.0352	4908.5547	1375.2268
106.4040	576.8235	448.4805	746.9724	1597.2312
-2739.5317	-7241.5039	-4198.3008	-1155.0937	-5688.0195
197.7715	1072.1326	23.9661	-357.2322	-1303.0574
-1285.7844	-1346.0513	-2375.1423	-3404.2351	-6194.4414
1960.4634	11379.2578	9232.9336	16426.9844	38527.6367
47021.4727	61324.9883	74758.8750	88192.8125	99999.8750
1958.0784	11365.4141	9121.1992	16184.1094	37896.2344
48646.4805	65407.1914	74011.5000	82615.9375	99999.8750
1527.5198	8866.2930	7147.7930	12696.9102	29750.8047
39188.6797	53468.4687	57154.5859	60840.7109	73304.1250
1275.7524	7404.9414	5927.9141	10511.5547	24604.3008
32445.6641	44295.8164	44882.3359	45468.8633	44923.7187
595.5071	3456.5454	2425.1011	4148.2187	9495.9805
7953.6250	7393.9687	11690.1367	15986.3164	11834.3398
363.3259	2108.8799	1618.0339	2837.9358	6598.8594

Figure C-1-Continued.

6046.1406	6240.4414	5462.7070	4684.9727	1353.2422
95.7875	555.9863	426.5796	748.1956	1739.7290
-2592.6445	-7245.3516	-4259.9570	-1274.5586	-5592.3789
189.5815	1100.4016	35.9701	-311.8560	-1257.9954
-1243.1052	-1381.8054	-2490.1116	-3598.4197	-6161.2969
2187.0061	10493.7969	9412.5508	16889.7422	40965.4336
49210.2070	62521.9141	70312.7500	78103.6875	99999.8750
2188.8826	10502.8008	9280.3594	16597.9609	40181.6133
50596.7422	66221.5625	71054.8750	75888.3125	99999.8750
1708.7773	8199.1367	7267.2500	13006.3672	31499.2070
40631.5078	53947.4375	55624.6211	57301.8125	65433.7148
1427.5850	6849.9062	6025.7500	10766.4609	26049.4258
33635.8828	44685.6602	44147.5234	43609.3867	42734.6523
601.5286	2886.2830	2366.1499	4159.1055	9966.8906
8138.6758	7148.4570	11266.1328	15383.8164	11405.3828
408.7278	1961.1772	1633.3794	2881.9863	6921.9258
6184.4102	6083.6719	5246.6719	4409.6758	1290.8984
107.3746	515.2097	429.0959	757.1111	1818.4216
-2669.3862	-7432.0508	-4415.9531	-1399.8516	-5551.3555
236.6726	1135.6135	38.5919	-312.1104	-1288.8250
-1316.1167	-1478.9226	-2439.4353	-3399.9495	-6138.6914
1882.2197	9547.0391	9616.8750	17770.0391	44181.6602
48946.5234	62125.4492	66173.6875	70222.0000	99999.8750
1888.2405	9577.5781	9459.7070	17415.1680	43210.8672
49970.7773	65320.8242	67850.0625	70379.3750	93694.4375
1475.2612	7482.8555	7401.2656	13629.2812	33822.3086
39984.6992	53020.5898	53674.2227	54327.8594	60539.7070
1232.9282	6253.6875	6135.3828	11280.6758	27969.9180
33095.6758	43910.6875	42976.6562	42042.6250	41606.8633
612.7939	3108.2290	2554.0720	4521.5234	10970.2656
8413.8047	7303.6992	11010.0156	14716.3437	11017.8047
368.0750	1866.9590	1615.8948	2895.0425	7073.3125
6043.9414	6053.5430	5081.6445	4109.7461	1077.2771
106.5741	540.5676	467.8735	838.2444	2048.0405
-2448.2114	-7365.3164	-4423.8945	-1482.4687	-5571.0586
225.6947	1144.7739	62.2762	-259.1123	-1157.8252
-1164.6853	-1371.7590	-2409.0249	-3446.2927	-6089.1016
1882.6172	9605.0273	9405.9023	19161.2812	45489.6992
48641.2109	63439.6641	64210.1758	64980.6914	99999.8750
1893.5688	9660.9023	9235.5469	18730.9180	44359.3594
49368.1758	66198.0000	66530.8125	66863.6875	84948.9375
1480.7544	7554.7422	7218.6289	14639.0195	34667.0234
39383.7617	53530.7852	53073.8086	52616.8359	58724.0391
1238.0020	6316.2305	5984.2812	12116.4961	28668.0547
32594.4336	44325.4180	42832.3047	41339.1953	42052.0742
650.6636	3319.6567	2467.7466	4737.2812	10868.5195
7915.3867	6857.5664	10525.6914	14193.8281	10655.8320
351.8142	1794.9404	1516.8503	3000.8850	7007.9570
5666.9336	5682.8359	4684.5234	3686.2148	660.0627
104.1161	531.1956	448.8975	888.0837	2073.9399
-2439.4231	-7536.8945	-4561.2656	-1585.6289	-5762.7266
237.5941	1212.1946	76.1520	-256.1233	-1144.2810
-1148.9758	-1428.7883	-2443.2527	-3457.7185	-6181.4922
2084.4705	9560.7383	8845.1055	19598.3594	43352.4648
50100.3242	59978.8984	59967.3789	59955.8633	83141.0625
2102.6311	9644.0352	8673.2187	19113.1680	42151.2070
50548.3750	62104.2578	62598.4023	63092.5508	76323.8125
1645.8862	7549.1055	6772.5312	14917.4492	32889.3281
40202.5078	50027.8984	50255.2656	50482.6406	55461.2930
1376.6504	6314.2148	5615.5820	12347.8984	27197.9141

33268.2148	41417.4062	40810.3594	40203.3164	41061.1914
644.7537	2957.2607	2248.9524	4778.9844	10320.9766
7898.3398	5969.2656	9556.3008	13143.3477	9997.8750
361.4602	1657.8926	1432.7925	3132.3479	6876.9648
5856.0156	5201.0000	4109.2148	3017.4297	239.3811
110.9265	508.7810	439.7014	961.2688	2110.4336
-2698.8669	-7676.8164	-4660.2383	-1643.6602	-5848.0742
268.7864	1232.8301	83.2180	-258.7390	-1115.9636
-1216.8962	-1393.8713	-2386.4446	-3379.0193	-6169.4258
1725.0520	8919.2852	8531.4570	20301.3555	43528.0039
49910.3437	55842.1680	55421.5117	55000.8555	69598.7500
1745.5759	9025.4023	8348.9297	19747.5430	42200.8047
50012.1797	57372.1172	58186.5625	59001.0156	67575.6250
1367.9019	7072.6602	6512.7227	15391.4297	32876.4570
39636.0117	46037.7969	46963.9453	47890.0977	50999.2383
1144.6755	5918.4805	5400.0820	12740.1680	27187.6445
32795.4453	38107.2187	38353.7578	38600.3047	38798.2383
518.1851	2679.2476	2163.1133	4979.2227	10479.2617
7775.5937	5001.7461	8558.6406	12115.5469	9453.1992
292.6125	1512.9370	1338.3276	3138.8931	6676.5273
5718.6250	4709.1055	3608.1631	2507.2187	81.2520
95.3301	492.8992	436.0134	1022.6196	2175.1453
-2832.8118	-7815.1953	-4843.6367	-1872.0742	-5753.6680
245.8389	1271.0959	111.1598	-200.1272	-972.7002
-1186.3745	-1389.3403	-2313.3103	-3237.2817	-6129.6328
1401.4800	8452.1836	8735.4023	21935.3945	44090.5469
47223.7266	52845.0547	51650.1562	50455.2617	60039.9922
1423.0227	8582.1055	8532.1875	21284.2656	42629.4375
47013.4648	53874.5664	54451.4258	55028.2891	60735.1328
1116.4873	6733.4219	6648.9531	16566.7266	33159.4609
37134.2578	43065.6055	44141.3945	45217.1914	47199.8555
934.7617	5637.4531	5513.1328	13713.2812	27422.5781
30722.2266	35640.5859	36237.7031	36834.8242	36717.9883
431.1155	2600.0134	2159.9294	5203.7773	10221.7422
7053.2695	4256.4297	7780.9219	11305.4258	8985.8242
254.7545	1536.3984	1334.5283	3245.3999	6408.9648
5247.1797	4361.8633	3241.7334	2121.6016	-161.1550
82.2114	495.8088	430.6636	1047.3186	2068.2280
-2828.7583	-7874.7891	-4965.9219	-2057.0508	-5807.9414
207.5220	1251.5439	115.8344	-200.5473	-934.6316
-1106.7280	-1337.1367	-2370.6602	-3404.1853	-6196.2148
1023.9604	8107.6250	9328.1992	23977.2930	41974.7227
45367.1914	50461.1016	48505.6367	46550.1758	53535.4609
1043.5588	8262.8047	9100.6211	23217.6172	40480.0117
44925.3320	51055.5195	51279.6953	51503.8789	55875.4570
819.8437	6491.4492	7085.8672	18048.8945	31441.0781
35386.1055	40658.2461	41712.8633	42767.4844	44435.4648
686.7751	5437.8242	5876.5625	14941.7461	26002.8906
29273.8008	33642.5859	34404.0547	35165.5273	35210.0156
366.1079	2898.8088	2348.2192	5611.3242	9422.6406
6574.0977	3972.1055	7322.8320	10673.5664	8587.6523
193.1095	1529.0234	1468.6941	3650.1760	6272.1055
5123.0742	4166.1875	2995.6592	1825.1289	-408.4094
65.2336	516.5134	496.1340	1233.0525	2118.7566
-2834.4670	-7893.9961	-5043.9805	-2193.9609	-5786.1250
159.5764	1263.5115	141.5854	-200.4908	-883.5022
-1065.1074	-1286.6584	-2264.6047	-3242.5525	-6174.3008
855.9006	8302.9531	9965.0898	24923.7227	40190.5820
44096.8047	49285.1133	46263.0859	43241.0547	49002.0937
875.7644	8495.6484	9719.3359	24096.5781	38669.4766

Figure C-1-Continued.

43453.3516	49500.6016	48973.7852	48446.9727	52418.6680
689.0059	6683.9336	7563.0508	18711.5586	29993.0156
34137.9805	39275.4844	39933.0430	40590.6094	42458.4844
577.5103	5602.3320	6274.6055	15493.3359	24807.2930
28239.7344	32493.2344	33071.1094	33648.9922	34161.5156
299.0557	2901.0918	2534.0366	5915.6836	9167.1523
6242.4609	3499.2695	6846.8125	10194.3672	8281.0820
173.2327	1680.5020	1624.5105	3888.2734	6115.9336
4911.2148	3849.2891	2743.1455	1637.0000	-517.7273
60.2505	584.4800	565.0061	1352.3452	2127.1284
-2889.9304	-7991.0156	-5119.2578	-2247.4922	-5722.5937
127.6129	1237.9519	151.8496	-214.3980	-869.4766
-1067.1584	-1295.8677	-2245.5457	-3195.2251	-6192.9180
788.3542	8753.5469	10696.9219	25720.0664	37628.2500
43613.8750	48031.7617	45532.9766	43034.1875	45285.0977
810.0928	8994.9219	10441.6914	24843.5937	36130.1055
42785.8867	47903.6914	47686.1055	47468.5195	49415.7461
638.3210	7087.6445	8123.0898	19274.4492	27987.2422
33533.4766	37874.3242	38668.1055	39461.8945	40621.2109
535.3601	5944.4102	6742.9609	15964.1016	23150.8750
27738.7734	31329.5820	32021.7539	32713.9336	33102.1875
256.0198	2842.7354	2742.2793	6244.2227	8848.2187
6071.7969	3077.1211	6451.5508	9825.9922	8148.1250
165.5650	1838.3623	1838.5203	4225.7422	6022.1602
4957.5703	3714.7773	2596.6045	1478.4297	-497.5420
57.9847	643.8376	643.8931	1479.9565	2109.1040
-2981.9873	-7965.8906	-5108.0000	-2250.1016	-5606.4180
109.0164	1210.4712	159.7417	-246.1097	-877.7495
-1083.9817	-1251.2490	-2266.3291	-3281.4106	-6149.2344
880.3921	9473.4805	11220.1445	26762.7461	36174.7305
43257.9453	47570.1562	45078.4922	42586.8242	42193.1719
908.7781	9778.9297	10968.8789	25839.9062	34674.5000
42255.2578	47129.2461	46680.5000	46231.7539	46803.9687
717.2644	7718.1406	8533.3984	20033.4727	26828.2148
33040.6055	37136.4883	37632.1094	38127.7344	38937.1992
601.9678	6477.4883	7088.0312	16598.6094	22195.2852
27330.8203	30715.6094	31157.0195	31598.4336	32069.9414
305.1353	3283.4158	2938.3340	6507.0508	8403.4492
5916.8164	3051.1680	6275.0742	9498.9922	8021.5469
187.2558	2014.9705	2000.1746	4567.0312	6013.8477
5016.5937	3697.9922	2537.7393	1377.4844	-450.4419
65.1246	700.7749	695.6292	1588.3428	2091.5220
-3040.2280	-7977.2266	-5117.7539	-2258.2773	-5529.2969
109.6862	1180.2815	163.8703	-260.3562	-860.8965
-1082.3674	-1234.5044	-2240.5955	-3246.6882	-6133.6211
227.0999	11111.5039	11729.6367	26895.1719	36250.9258
43100.9414	48007.4961	45239.8203	42472.1445	40417.9141
235.5500	11524.9453	11499.9687	25979.3437	34699.7969
41929.4492	47268.4648	46342.0312	45415.6016	45078.5273
186.2384	9112.2383	8951.1250	20133.9141	26820.0625
32711.5352	37128.0156	37150.6289	37173.2500	37684.5234
156.4105	7652.8242	7441.2305	16689.7812	22192.4570
27059.1680	30705.7578	30751.8047	30797.8594	31246.5117
78.7335	3852.2566	3139.4390	6656.7578	8531.5508
5805.8555	2818.3711	6072.2500	9326.1406	7878.7305
44.3650	2170.6829	2057.7898	4581.8281	6064.5703
4925.3242	3563.9961	2473.4404	1382.8828	-438.6836
15.7543	770.8257	730.7366	1627.0427	2153.5750
-2995.3594	-8009.2266	-5132.5469	-2255.8633	-5501.5703
23.7787	1163.4387	161.2980	-253.5479	-849.0234

-1074.3579	-1251.2485	-2219.5422	-3187.8376	-6210.7930
137.6130	11939.2539	11382.2773	26730.6992	36867.9219
42767.9687	48146.3789	45608.3398	43070.3008	40865.6250
143.4566	12446.2461	11180.4219	25826.0625	35255.7969
41448.6406	47135.9414	46269.9102	45403.8828	44749.5586
113.6370	9859.1055	8705.1094	20007.3477	27225.7070
32266.7500	36914.2383	36908.0078	36901.7812	37065.8203
95.5071	8286.1602	7240.9805	16591.1914	22532.8711
26692.7812	30527.1211	30545.1797	30563.2422	30723.4961
47.0322	4080.4932	3050.9587	6637.6680	8708.5937
5765.1914	2751.4766	6090.0195	9428.5703	7828.0078
26.0950	2263.9939	1960.4563	4479.6523	6073.2344
4844.2148	3556.1172	2505.7041	1455.2891	-381.4995
9.1837	796.7739	689.9492	1576.5383	2137.3718
-2924.9583	-7951.6133	-5049.0508	-2146.4844	-5455.4727
13.4099	1163.4397	144.9597	-265.4900	-878.9819
-1052.9451	-1214.0657	-2227.2249	-3240.3857	-6177.4531
-49.9903	12118.2266	12629.5586	26699.9570	36777.6680
42315.4805	48560.0820	46046.8555	43533.6289	41264.2148
-52.3904	12700.0352	12426.1328	25804.7344	35149.2969
40881.5195	47296.5820	46291.2656	45285.9531	44418.5664
-41.5825	10080.0820	9677.9570	19984.6992	27123.9062
31766.0664	36936.8125	36751.4453	36564.0781	36477.9570
-34.9752	8478.3867	8054.3320	16578.4414	22454.2656
26280.9531	30546.6133	30410.4180	30274.2266	30226.0742
-14.8516	3600.2073	3169.1008	6364.8398	8482.6367
5617.5703	2846.3398	6110.8437	9375.3594	7738.8672
-9.7804	2370.8926	2198.4844	4491.2734	6053.4961
4787.2344	3600.9336	2530.3252	1459.7148	-299.0200
-3.4339	832.4099	771.8779	1576.8674	2125.3560
-2874.1062	-7921.5742	-5018.3203	-2115.0625	-5354.6094
-4.8848	1184.1233	162.7788	-271.2737	-896.5630
-1049.1377	-1219.2363	-2186.2747	-3153.3147	-6098.0156
-342.2080	12380.5664	14472.3437	26379.1602	35835.1562
42649.0156	49815.1914	46811.1016	43807.0117	41706.2578
-360.6331	13047.1523	14278.0820	25522.3906	34243.7852
41100.8750	48297.4922	46654.5625	45011.6367	44186.3359
-286.8335	10377.1992	11127.9492	19765.5352	26410.5391
31886.8320	37626.5430	36873.8633	36121.1836	36001.2344
-241.4503	8735.3008	9267.2500	16404.2500	21870.0898
26383.9609	31115.7891	30507.3359	29898.8867	29820.7656
-114.3409	4136.6797	3845.1611	6497.2422	8391.3477
5620.9102	2896.9102	6141.0508	9385.2031	7722.1250
-66.4346	2403.5017	2559.4197	4535.9414	6052.0625
4795.9961	3579.5547	2572.5769	1565.5977	-211.5234
-23.7791	860.2917	916.0999	1623.5627	2166.2317
-2890.3572	-7970.8203	-5043.1406	-2115.4570	-5261.6328
-32.4129	1172.6484	188.2533	-267.5015	-882.6699
-1054.7471	-1235.5376	-2209.6431	-3183.7502	-6049.4570
-391.1624	13067.1523	15000.8516	26389.8086	34945.6367
43048.6172	51114.2656	47742.3281	44370.3867	42137.9805
-414.6077	13850.3672	14858.4180	25582.9570	33404.1016
41400.3945	49360.7812	47218.5859	45076.3945	43993.4609
-330.4839	11040.1289	11593.5664	19818.6758	25753.3828
32075.0586	38368.9180	37169.3789	35969.8398	35584.5820
-278.4270	9301.1211	9663.1875	16457.9453	21333.0430
26543.7773	31731.4883	30748.6602	29765.8320	29465.6875
-140.6056	4697.0625	4186.9805	6722.1641	8354.1523
5648.5391	2938.0312	6153.2578	9368.4922	7709.8086
-75.0005	2505.4631	2701.3894	4658.9570	6090.0273

Figure C-1-Continued.

4810.0352	3525.8711	2587.1101	1648.3477	-78.6006
-26.3867	881.4712	950.4019	1639.1147	2142.5920
-2926.4624	-7992.9805	-5023.6406	-2054.2930	-5179.7305
-35.6647	1191.4121	208.4175	-252.5116	-860.9570
-1067.8188	-1273.7546	-2250.7898	-3227.8264	-5999.9102
-672.7688	13765.2734	15081.2344	26579.3984	35102.2344
43670.6445	52021.1172	48510.2891	44999.4609	42894.4180
-717.3699	14677.8359	14994.9687	25821.7852	33579.7187
41928.8281	50068.6992	47657.1562	45245.6094	44185.6836
-573.1208	11726.4141	11713.5859	20011.9687	25883.9766
32444.1172	38842.3555	37380.7500	35919.1484	35502.8711
-483.2627	9887.8594	9770.8516	16627.9844	21449.3047
26854.7422	32126.1680	30921.6445	29717.1250	29388.8477
-219.9732	4500.7891	4033.6750	6608.6328	8296.4414
5571.6719	2819.1016	6159.7734	9500.4531	7739.3594
-124.0536	2538.2134	2647.0259	4590.5234	5998.1836
4789.5898	3557.1016	2626.3582	1695.6133	-1.2017
-44.5389	911.2935	950.3604	1648.1355	2153.5251
-2938.1421	-8015.1445	-5010.5898	-2006.0273	-5100.7383
-57.0982	1168.2651	198.4114	-253.3721	-854.4116
-1091.9246	-1323.9883	-2201.8872	-3079.7878	-5955.4922
-772.2424	13688.7852	15405.6367	26176.2422	35812.1875
44416.8086	52632.7578	49256.9727	45881.1875	43701.3906
-828.5334	14686.5977	15354.1602	25471.2734	34301.1172
42597.2344	50520.6016	48112.4453	45704.2852	44470.6484
-663.5034	11761.2734	12002.7031	19745.5508	26440.0859
32927.0977	39125.9844	37619.6875	36113.3945	35515.8867
-559.9749	9926.1250	10017.2617	16414.0156	21919.3242
27261.7227	32365.5664	31118.9414	29872.3203	29391.3281
-233.4545	4138.2187	3959.2817	6360.3711	8376.9102
5626.7383	2827.3320	6205.2656	9583.2070	7814.2187
-145.0484	2571.1301	2696.1982	4477.4023	6033.7500
4822.7773	3569.6133	2682.8484	1796.0820	141.8123
-51.5791	914.2917	958.7659	1592.1631	2145.5969
-2953.1128	-8025.9805	-4991.7539	-1957.5195	-5003.0781
-66.6208	1180.9219	203.8111	-245.3233	-859.3169
-1100.0359	-1331.1289	-2211.2686	-3091.4097	-5873.6406
-484.1360	13174.7773	15272.0937	26228.1133	36410.1562
44849.8320	52680.4062	49747.2422	46814.0742	44736.3867
-522.7319	14225.0859	15250.3789	25562.9492	34932.9922
42989.3125	50461.8086	48354.5547	46247.3047	45025.4727
-419.6421	11419.7109	11928.3320	19822.1992	26932.3125
33203.7109	39024.1797	37706.2578	36388.3398	35762.0820
-354.4905	9646.7383	9959.5000	16484.7187	22337.7891
27499.3789	32287.5078	31191.4375	30095.3672	29587.8242
-165.5352	4504.7031	4115.3984	6507.1562	8538.8906
5676.8398	2737.6953	6231.1055	9724.5234	7944.7227
-91.1460	2480.3540	2657.5215	4453.6992	6085.4023
4874.0430	3596.4961	2729.0320	1861.5664	284.8518
-32.2167	876.7131	939.3352	1574.2187	2150.9644
-2958.3350	-8027.4570	-4974.9844	-1922.5039	-4936.6406
-43.9837	1196.9280	209.9230	-236.1011	-853.9685
-1089.5559	-1310.3467	-2232.3469	-3154.3486	-5829.8594
-451.0039	12462.3242	15700.8945	26710.4062	36500.4531
44532.5898	52509.9766	50150.3633	47790.7539	45537.2422
-490.1309	13543.5000	15711.5898	26084.0000	35095.0703
42687.2500	50226.9531	48547.5156	46868.0781	45383.3750
-394.4683	10900.1133	12296.9219	20234.7187	27067.5977
32952.4883	38796.8750	37767.1758	36737.4766	35868.6250
-333.5398	9216.5078	10271.8086	16835.3945	22461.3633

27301.0977	32107.2695	31244.3164	30381.3633	29670.0703
-163.4675	4517.0000	4295.5508	6642.0898	8509.3906
5645.9687	2775.6094	6293.1562	9810.7148	7940.7812
-88.6494	2449.5964	2764.4829	4549.5039	6086.2500
4855.6094	3619.0000	2751.6179	1884.2344	244.4556
-31.2524	863.5806	974.5906	1603.8838	2145.6467
-2933.3518	-8008.7422	-4926.8672	-1844.9883	-5000.5664
-42.9721	1187.4224	214.4731	-246.3940	-857.6572
-1083.2393	-1307.4900	-2163.2029	-3018.9172	-5929.4883
-470.1287	12183.5039	16646.7461	26942.2930	36278.0352
44758.6250	52192.8359	50339.7617	48486.6875	46073.8047
-514.3125	13328.5391	16716.7148	26387.1406	34972.0859
42929.9102	49884.1055	48567.1328	47250.1641	45521.3125
-415.0093	10755.0742	13098.7187	20485.9961	26988.1133
33129.8203	38497.0156	37705.0156	36913.0195	35819.1914
-351.2466	9102.6484	10948.6914	17054.4219	22407.7266
27459.0625	31868.4570	31196.8945	30525.3320	29624.7539
-147.1431	3813.2488	4366.4805	6689.7031	8692.4961
5863.8633	2898.1406	6357.8711	9817.6133	7853.6211
-93.2232	2415.9028	2948.9084	4615.2891	6082.9961
4978.5859	3757.7852	2824.4617	1891.1367	212.5073
-32.7942	849.8691	1037.3704	1623.5725	2139.8838
-2941.7292	-7954.5664	-4884.4375	-1814.3047	-5014.6016
-45.5572	1180.6265	227.9057	-250.6528	-855.0959
-1072.3557	-1264.5459	-2202.5762	-3140.6082	-5922.2969
-277.6318	11973.4180	16715.8711	27093.3086	36164.5000
44529.5156	51989.6055	50457.0117	48924.4219	46354.4258
-305.7754	13187.1719	16851.4023	26623.4922	34968.8242
42759.4727	49681.1641	48550.9648	47420.7656	45453.3828
-247.3950	10669.3945	13221.5156	20689.3164	27005.9219
32995.9531	38315.4492	37626.6094	36937.7734	35626.0859
-209.5908	9039.0156	11058.9883	17234.5117	22435.8398
27360.4141	31728.9766	31137.6172	30546.2578	29462.2383
-89.9688	3880.0806	4426.9180	6737.3633	8632.0703
5844.3867	2937.9336	6393.2852	9848.6445	7812.9375
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4996.9648	3795.4609	2834.6804	1873.8984	244.4563
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-27.0878	1168.2151	226.1423	-254.7661	-852.3872
-1064.5056	-1254.9915	-2209.8899	-3164.7898	-5906.7344
457.3970	11733.1602	16451.2539	26672.5820	36121.4062
44477.9844	52017.6289	50752.7617	49487.8984	46587.0898
507.2068	13010.8828	16651.5508	26305.1211	35048.0273
42781.6367	49729.4687	48741.4297	47753.3906	45385.9648
411.4832	10555.3789	13082.7227	20464.1680	27092.3359
33018.1406	38337.4961	37720.2031	37102.9141	35451.2578
348.9531	8951.3555	10950.5352	17058.0625	22521.8867
27392.3359	31759.6680	31222.3477	30685.0273	29316.4609
166.4758	4270.4414	4528.5742	6707.5078	8555.7305
5809.9648	2957.4883	6411.4258	9865.3750	7779.7461
92.1266	2363.2349	2902.5742	4527.1953	5982.2773
4969.0234	3864.5039	2892.5847	1920.6641	259.5925
32.1342	824.3071	1012.4312	1579.1086	2086.6460
-2926.1130	-7885.1250	-4849.7422	-1814.3555	-4948.9023
45.3546	1163.4387	226.5632	-243.7383	-838.3467
-1061.9866	-1266.1211	-2128.8760	-2991.6323	-5884.9180
462.6846	11498.2500	16929.4609	26725.4062	36453.6289
44767.6172	52148.0039	51058.2852	49968.5664	46702.2383
516.6084	12838.3164	17204.1367	26458.1445	35507.0547

Figure C-1-Continued.

43155.8320	49904.6211	48975.0352	48045.4531	45250.5625
420.2676	10444.1367	13535.5039	20607.4727	27477.5117
33319.5664	38466.7617	37858.3477	37249.9375	35240.3164
356.7625	8865.9609	11337.1914	17188.8633	22857.4531
27657.4727	31880.7148	31345.5859	30810.4570	29142.6172
158.5200	3939.4038	4497.6719	6562.6602	8505.1523
5846.6289	3066.1797	6516.9922	9967.8125	7785.4609
89.7159	2229.5422	2893.5366	4407.2422	5878.1602
4922.1172	3863.4258	2924.0613	1984.6953	375.6963
30.5788	759.9182	986.2344	1502.1685	2003.5154
-2964.8293	-7871.3437	-4822.5117	-1773.6758	-4830.2656
46.4992	1155.5598	228.4234	-247.2560	-842.0347
-1062.9954	-1261.7881	-2190.1909	-3118.5955	-5788.4414
535.4050	10600.2305	17388.1641	26618.9219	36207.2070
45221.3398	52156.0352	51280.8437	50405.6523	47037.1445
601.9424	11917.5703	17721.7969	26445.4414	35416.6641
43708.5703	49990.6016	49162.3203	48334.0391	45371.6406
491.0552	9722.1680	13956.3242	20619.5117	27442.3594
33765.6836	38536.3437	37971.7383	37407.1328	35244.8008
417.2778	8261.4883	11695.4570	17209.0469	22844.4531
28043.9297	31953.8555	31450.0234	30946.1914	29148.5273
168.1707	3329.5322	4393.4609	6325.8164	8280.2344
5799.4023	3051.8984	6567.9687	10084.0469	7895.4805
115.2934	2282.6392	3036.8237	4384.0273	5748.4531
4914.0156	3853.6172	2978.0066	2102.3945	503.5286
37.1707	735.9255	979.0754	1413.4167	1853.3083
-3089.9060	-7891.0352	-4815.6875	-1740.3359	-4739.4023
57.2740	1133.9397	208.8752	-298.5364	-907.2007
-1133.4546	-1307.5886	-2168.4963	-3029.4058	-5722.0039
511.3401	10448.6875	16948.9805	26106.8906	36077.4219
45111.8086	52037.4023	51494.2227	50951.0469	47404.1562
578.8679	11828.5469	17360.4766	26059.0781	35451.7539
43738.8906	49981.4023	49372.7109	48764.0234	45564.1602
473.5601	9676.6914	13696.0352	20349.7734	27508.7344
33815.3516	38541.2344	38113.6406	37686.0508	35318.5859
402.8225	8231.2461	11486.5430	16996.8867	22916.7539
28102.6367	31974.8320	31579.5781	31184.3281	29213.5586
169.3544	3460.5745	4302.9766	6138.9883	8082.1094
5779.8594	3207.4297	6689.0703	10170.7227	7954.5703
106.8939	2184.2620	2918.8628	4263.0469	5699.9336
4891.6719	3854.7461	2996.5457	2138.3437	597.7542
32.3696	661.4370	883.8884	1290.9351	1726.0510
-3180.4697	-7938.3125	-4817.6328	-1696.9453	-4694.5859
55.3556	1131.1326	195.4869	-310.5879	-931.3811
-1168.4644	-1350.9268	-2196.4939	-3042.0625	-5670.9805
593.4915	10062.7383	16611.7773	25352.8086	35323.9180
44795.4102	51959.5742	51653.7852	51348.0000	47977.8047
676.5093	11470.3164	17100.8320	25430.8984	34882.0898
43581.5352	50036.1797	49562.0352	49087.8906	45993.2383
554.9998	9410.1055	13515.5039	19891.8633	27109.2734
33725.0937	38603.8008	38249.2773	37894.7539	35588.6602
472.5811	8012.6836	11344.1758	16627.3672	22601.5586
28045.5937	32045.0625	31705.6172	31366.1719	29442.5430
224.3360	3803.6497	4439.5430	6105.4883	7954.6094
5736.1797	3222.2969	6733.6914	10245.0937	8050.1094
124.9716	2118.9119	2870.1438	4151.7031	5596.1211
4821.0078	3797.5781	3002.9304	2208.2812	707.2034
36.1901	613.6084	831.1550	1202.2786	1620.5620
-3257.7964	-7968.3555	-4822.5078	-1676.6562	-4638.2969
67.0705	1137.1899	175.5008	-352.0728	-1001.3137

-1214.9954	-1366.0952	-2265.4661	-3164.8384	-5634.4414
624.5579	9751.8594	16421.0469	25047.7695	34578.8984
44376.9883	51386.2773	51484.5859	51582.9023	48515.7695
716.7986	11192.1094	16996.0195	25257.2383	34324.5937
43341.8242	49635.3047	49463.7617	49292.2187	46424.3789
589.7109	9207.7578	13459.0117	19791.5117	26721.6133
33577.0703	38322.4297	38172.5000	38022.5703	35872.1133
502.6501	7848.3906	11306.2773	16557.0273	22296.3867
27941.6250	31830.9219	31656.8281	31482.7344	29684.3516
222.5712	3475.2307	4308.1523	6014.4453	7849.6055
5670.4687	3134.9766	6720.5703	10306.1758	8140.2383
134.6571	2102.5386	2873.3357	4142.1367	5522.3477
4747.8320	3674.9492	2960.3308	2245.7109	804.7842
38.3486	598.7751	818.2878	1179.6270	1572.6921
-3322.6731	-8009.2266	-4823.6641	-1638.0937	-4594.7109
71.2448	1112.4170	149.2157	-394.3955	-1050.8577
-1263.0869	-1395.9397	-2150.7676	-2905.5967	-5568.7930
866.4282	9838.6250	16094.4961	24486.8867	34005.0469
43495.2852	50627.0547	51309.1875	51991.3281	49110.5859
1001.1331	11368.2500	16768.8125	24839.7187	33939.8828
42662.7969	49072.3867	49383.7773	49695.1719	46944.4727
825.9456	9378.9297	13311.8398	19505.4687	26470.6172
33093.7891	37922.5039	38118.4531	38314.4062	36235.5781
704.7224	8002.3945	11194.0820	16332.7773	22105.3906
27559.4922	31519.2266	31628.0234	31736.8242	29994.1289
272.4861	3094.1868	4059.2483	5806.8164	7759.5273
5614.9258	3165.8594	6777.8594	10389.8672	8289.4531
185.9789	2111.8621	2830.8699	4077.2983	5472.7109
4684.1523	3641.6133	2972.7173	2303.8203	919.1094
50.3937	572.2402	767.0659	1104.8049	1482.9121
-3372.3181	-8044.6875	-4846.3437	-1647.9922	-4530.7383
97.1919	1103.6516	133.4519	-412.6311	-1080.8005
-1276.1196	-1402.2434	-2246.8010	-3091.3599	-5506.4922
1002.3696	9565.8828	15239.4883	23783.2539	33007.6211
42985.3398	49567.3008	50913.5391	52259.7852	49549.2109
1165.9365	11126.8437	15974.2227	24267.1367	33132.6445
42355.0039	48231.4062	49113.6758	49995.9492	47348.6523
964.5862	9205.3047	12709.5586	19095.2383	25891.3555
32901.9609	37313.3828	37925.5742	38537.7695	36520.2656
823.8406	7862.1328	10697.4766	16003.4375	21640.2422
27420.2656	31034.1406	31484.9687	31935.8047	30240.3711
357.4058	3410.8186	4039.7393	5777.1992	7583.0312
5452.2070	2890.6719	6665.6250	10440.5898	8339.6914
221.9713	2118.3313	2700.5945	3959.6240	5285.0781
4569.3086	3492.5820	2918.8872	2345.1914	983.0583
59.4997	567.8218	723.8982	1061.3831	1416.6733
-3464.6497	-8072.2734	-4862.9453	-1653.6094	-4531.1797
112.5921	1074.4966	103.9566	-445.9736	-1120.4944
-1318.0347	-1411.4529	-2201.5171	-2991.5828	-5530.8242
840.8105	9537.0586	14564.7656	23009.9336	32126.8320
42000.9883	48295.2656	50340.0508	52384.8398	49993.2578
984.4185	11165.9570	15371.6602	23627.0937	32439.2773
41588.0820	47192.1992	48690.5937	50188.9961	47789.2383
816.6514	9263.0273	12261.7539	18634.2187	25401.5469
32357.3086	36555.1523	37621.4062	38687.6641	36843.3516
698.1814	7919.2578	10331.2539	15631.9531	21249.5000
26987.4805	30425.2383	31250.4141	32075.5937	30520.0859
322.1257	3653.7749	3972.8547	5647.6641	7360.1797
5281.7031	2753.0586	6610.1211	10467.1914	8418.9805
190.3077	2158.6021	2608.3601	3851.5127	5152.6445

Figure C-1-Continued.

4483.5937	3432.3945	2926.2192	2420.0430	1048.5979	25339.6875	28384.2461	30570.7773	32757.3125	31928.1055
51.0192	578.6953	699.2700	1032.5444	1381.3625	192.6874	3667.8552	3721.9587	5104.6133	6592.7539
-3515.2053	-8112.1602	-4853.2891	-1594.4102	-4501.2383	4736.2031	2309.3828	6412.6602	10515.9492	8755.8437
93.3279	1058.5894	97.7010	-439.9524	-1110.6445	114.9429	2187.9690	2454.6099	3502.9883	4655.8281
-1322.0439	-1420.7612	-2162.6362	-2904.5127	-5476.4531	4194.0273	3227.2344	2866.0024	2504.7695	1274.1941
733.3906	9385.7617	14062.9453	22241.0742	30988.1484	35.8380	682.1858	765.3218	1092.1951	1451.6389
41099.3867	47063.5078	49835.7266	52607.9531	50522.5977	-3536.0059	-8097.8828	-4815.8633	-1533.8359	-4505.0781
864.1431	11059.1016	14943.1289	22984.3047	31479.8008	54.3934	1035.3936	134.9458	-348.3494	-964.1814
40902.3008	46197.5781	48350.3047	50503.0352	48341.5703	-1216.7212	-1322.7571	-2105.7297	-2868.7039	-5503.2422
718.8074	9199.1289	11950.7070	18169.6992	24702.9687	517.6050	9306.6016	12845.0859	19549.6641	26972.6289
31877.1484	35834.7812	37387.3750	38939.9727	37262.1406	36779.1328	42619.1016	47568.2656	52517.4375	51961.8633
615.1289	7872.2773	10079.4844	15256.8906	20683.6523	624.4219	11227.1836	14048.5078	20757.8516	28101.3906
26608.1641	29847.7969	31074.6992	32301.6055	30880.5781	37418.8672	42700.8164	46868.5937	51036.3789	50161.1641
262.0615	3353.8037	3745.0374	5412.4648	7113.2109	524.6750	9433.7227	11361.6836	16577.5508	22255.2109
5149.0586	2665.3437	6599.0156	10532.6953	8561.3047	29385.7148	33347.0508	36407.8789	39468.7187	38722.6250
167.9656	2149.5842	2538.6958	3743.0437	4987.1211	450.6316	8102.4141	9624.0508	13975.9531	18702.9219
4374.0273	3319.5742	2889.0220	2458.4687	1163.2671	24610.5508	27863.9961	30341.7148	32819.4414	32159.5664
46.5506	595.7439	703.5837	1037.3618	1382.1501	188.6265	3391.5273	3585.9536	4986.0273	6472.0469
-3547.4272	-8119.0547	-4829.0352	-1539.0078	-4466.6172	4600.4219	2232.6602	6399.4219	10566.1953	8775.5352
81.7778	1046.5730	107.0432	-413.3398	-1064.3018	119.6271	2150.9099	2431.0793	3468.4468	4585.5039
-1294.3394	-1393.7727	-2217.3755	-3040.9795	-5421.4922	4142.5781	3252.8906	2884.2446	2515.5977	1306.1167
662.7544	9429.3359	13797.4922	21366.7383	30066.9570	40.0534	720.1648	813.9707	1161.3008	1535.3127
39798.1094	45869.8633	49270.3633	52670.8750	51046.5781	-3447.4871	-8058.4844	-4787.4219	-1516.3555	-4556.2500
785.7683	11179.5156	14768.3945	22229.8750	30733.8398	58.0319	1043.4209	156.9666	-313.7471	-909.9885
39819.0742	45242.9805	47965.5312	50688.0898	48917.0430	-1149.8362	-1265.6772	-2127.5708	-2989.4658	-5531.6094
655.3398	9323.8437	11844.1328	17617.2266	24171.0156	555.3352	9285.3477	12465.6289	19052.0312	26357.0937
31088.8320	35148.0664	37124.6445	39101.2305	37708.0000	36500.4570	41944.9687	47245.3828	52545.8086	52016.5820
561.3484	7986.5820	10000.5469	14807.8320	20256.6602	673.5061	11261.1953	13725.1328	20363.4102	27636.5937
25971.4922	29298.2734	30875.9141	32453.5586	31265.2109	37351.5781	42258.1445	46760.3086	51262.4844	50375.2539
233.4744	3321.7561	3668.7107	5201.3242	6908.6797	567.2256	9484.1562	11129.3516	16303.5742	21939.4727
4918.4883	2476.0469	6501.1602	10526.2852	8716.9297	29393.8789	33064.2969	36376.4453	39688.6055	38920.1719
151.8638	2160.6416	2497.4707	3600.1060	4837.2617	487.5820	8152.4961	9436.6016	13758.2773	18454.7109
4251.4180	3274.6602	2878.8755	2483.0898	1193.4221	24638.5391	27650.5469	30337.4062	33024.2734	32343.2734
43.5482	619.5818	716.1704	1032.3601	1387.1250	217.1158	3630.2322	3683.3103	5105.1602	6605.7617
-3535.3977	-8132.8477	-4843.1172	-1553.3867	-4471.3437	4807.2383	2389.8633	6450.1875	10510.5234	8744.5078
72.2480	1027.9084	106.0915	-398.7590	-1042.6821	127.5715	2133.0278	2382.5005	3429.4224	4559.6992
-1265.5769	-1372.1030	-2121.5632	-2871.0249	-5428.6797	4215.5859	3328.7852	2907.1646	2485.5430	1253.9924
579.2505	9431.7383	13326.2539	20753.0039	29015.4648	44.9088	750.8875	838.7087	1207.2559	1605.1460
38909.3555	44757.4687	48710.0547	52662.6523	51514.7344	-3426.2761	-8016.6172	-4762.9414	-1509.2617	-4583.1875
690.9048	11249.7656	14369.1250	21739.1055	29846.2187	63.5003	1061.7419	180.2058	-273.0408	-855.6577
39142.5742	44368.9023	47597.9219	50826.9531	49465.3633	-1114.7930	-1230.4165	-2071.6008	-2912.7866	-5552.6875
577.7046	9406.5664	11556.7578	17272.3984	23526.4414	406.8452	9234.9453	12112.2812	18584.1328	26049.1172
30617.9609	34525.8437	36880.1875	39234.5391	38141.4570	35931.8281	41244.3789	46836.4609	52428.5586	51703.7422
495.3054	8064.8906	9768.6328	14532.7148	19734.6211	495.9180	11256.7969	13417.8984	19988.8164	27488.5039
25599.3359	28802.2500	30692.8437	32583.4453	31640.9883	36989.5039	41785.8125	46572.5781	51359.3555	50248.0000
225.0168	3663.8701	3749.9172	5243.1914	6818.3008	418.5828	9501.3711	10906.3242	16042.2305	21874.3398
4914.1328	2498.9961	6525.9375	10552.8906	8745.9883	29171.8672	32759.0312	36286.2266	39813.4297	38859.6211
134.8908	2196.3801	2462.2344	3566.4094	4756.1016	360.0955	8173.7734	9255.8164	13550.1680	18416.9414
4222.7344	3250.2891	2870.6333	2490.9766	1232.1562	24473.9102	27418.0469	30284.4062	33150.7734	32313.2187
39.7657	647.4917	725.8655	1051.3757	1402.0967	165.7208	3761.6797	3621.3186	4972.7305	6453.9727
-3550.1963	-8133.3437	-4852.4805	-1571.6094	-4486.7578	4757.1953	2455.3594	6490.5742	10525.8008	8684.9219
63.1018	1027.4651	111.4098	-386.8911	-1022.2446	91.2498	2071.2705	2310.5649	3364.6055	4556.3945
-1259.8928	-1366.5383	-2178.0510	-2989.5649	-5483.0039	4202.5898	3314.2617	2922.0669	2529.8711	1233.8005
491.5361	9356.5234	13126.4844	20118.4883	28023.3242	33.9231	770.0183	858.9788	1250.8303	1693.8918
38193.9961	43765.7773	48229.6836	52693.6016	51800.4297	-3342.1440	-7953.0898	-4719.1875	-1485.2773	-4649.3281
589.6863	11224.8359	14253.6094	21216.5078	29009.7109	47.2502	1072.5271	199.4653	-230.7296	-798.2839
38637.8516	43613.6562	47318.5977	51023.5508	49862.3320	-1062.4382	-1191.4614	-2103.5879	-3015.7158	-5621.5859
494.2988	9409.1094	11495.2227	16899.9023	22920.3281	557.9226	9245.5469	12143.1836	18354.6367	25697.9453
30282.0078	33997.4687	36708.4805	39419.4961	38466.2461	35574.6641	40823.0430	46439.3242	52055.6172	51233.2578
424.1755	8074.2969	9726.7969	14233.4102	19244.0156	683.3269	11323.6680	13536.4453	19867.7187	27289.9961

Figure C-1-Continued.

36838.0391	41593.3711	46403.9141	51214.4687	49977.9648
577.9753	9577.8477	11029.8516	15984.1797	21768.5820
29115.1094	32673.6992	36214.2773	39754.8672	38693.1211
497.5916	8245.7773	9369.2695	13513.6562	18344.7031
24447.3555	27369.3555	30247.1992	33125.0508	32195.5195
214.9603	3562.1875	3554.9773	4874.8516	6382.5234
4759.5000	2517.2617	6512.6680	10508.0820	8602.0859
125.1160	2073.3435	2345.1108	3376.9399	4579.0547
4299.4219	3460.4258	2972.5005	2484.5742	1201.8682
49.5785	821.5847	929.2754	1338.1489	1814.5000
-3243.3423	-7879.2227	-4661.0000	-1442.7773	-4700.1523
65.2269	1080.8992	230.5221	-179.1862	-719.3386
-987.1084	-1126.4536	-2021.2441	-2916.0364	-5664.4805
431.4956	9178.4727	12109.5352	18260.8398	25694.4805
35324.1367	40795.0937	46256.2695	51717.4570	50753.5039
530.8630	11292.1484	13572.0039	19882.8086	27457.3477
36795.2852	41801.3242	46455.4141	51109.5156	49706.0273
449.9070	9570.1094	11082.2812	16032.5820	21954.4844
29144.8516	32904.0039	36317.2461	39730.5000	38528.7656
387.6111	8244.9922	9421.2109	13566.0977	18518.0977
24493.4570	27585.2070	30356.6484	33128.1016	32079.7852
164.5667	3500.5469	3606.3821	4993.1250	6629.3945
5052.1523	2880.1211	6673.9062	10467.6992	8495.2695
96.5287	2053.2903	2347.8145	3381.5557	4616.6758
4350.6992	3572.5156	3026.3247	2480.1328	1156.3777
40.3113	857.4736	980.4697	1412.1699	1927.9683
-3118.0479	-7796.9766	-4615.4961	-1434.0117	-4710.0000
51.4516	1094.4419	259.3455	-130.0223	-646.8704
-917.9963	-1081.0471	-2040.0576	-2999.0696	-5671.7695
511.1267	9048.7266	11841.3555	17885.7031	25609.7187
35425.0508	40940.1289	46185.2852	51430.4492	50164.1680
631.4832	11179.4570	13339.4961	19585.4961	27535.2656
37114.2617	42187.9492	46623.4062	51058.8750	49331.1250
536.1790	9492.2383	10914.3281	15827.6055	22068.9297
29460.8789	33276.5625	36513.7539	39750.9531	38287.4258
462.2466	8183.3789	9285.3320	13403.6719	18631.2266
24779.9219	27920.5820	30544.6133	33168.6484	31900.0352
210.5155	3726.8591	3657.3252	4991.8633	6667.0742
5071.4102	2860.1289	6656.7695	10453.4180	8468.2305
113.1334	2002.8552	2320.1414	3373.1492	4711.3320
4466.1289	3678.7891	3091.2798	2503.7695	1141.2478
49.0305	868.0115	1005.5190	1461.8792	2041.8303
-3031.7944	-7737.3906	-4585.0898	-1432.7812	-4730.4414
61.9097	1096.0181	274.4285	-91.6782	-588.2302
-872.5791	-1051.0056	-2018.1665	-2985.3291	-5696.0977
486.5767	9007.9687	11857.7344	18029.9609	25893.8008
35896.8906	41231.5156	46176.1250	51120.7422	49508.5273
603.5076	11172.7070	13422.2383	19851.8867	28008.5742
37827.6133	42727.0898	46857.4141	50987.7500	48892.4180
513.3149	9502.9727	11002.7305	16076.9609	22500.6953
30092.7305	33771.1445	36764.3047	39757.4727	37998.4375
442.8123	8197.7617	9367.0352	13625.5703	19012.3125
25332.7930	28358.6875	30778.1680	33197.6523	31680.3867
194.9665	3609.4045	3597.9268	4970.8789	6688.5898
5268.7461	3163.6953	6820.8711	10478.0547	8387.4648
112.2130	2077.3923	2361.5583	3429.1323	4779.0977
4626.2969	3871.8398	3216.1274	2560.4141	1158.0664
50.5450	935.7363	1063.7354	1544.6116	2152.6873
-2933.8806	-7638.8906	-4532.0937	-1425.2930	-4722.7578
59.5938	1103.2578	294.7146	-53.5590	-528.9258

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640.3372	8893.4141	11751.4727	17926.8398	26050.0117
35855.3828	41769.0625	46329.2930	50889.5352	48792.8984
797.0984	11070.6172	13362.2187	19842.5234	28343.0078
37995.7461	43524.4766	47259.8672	50995.2656	48393.3789
679.0669	9431.3203	10972.9727	16102.3164	22821.5234
30290.5586	34471.9023	37149.3164	39826.7383	37663.6602
586.1392	8140.6797	9347.7812	13657.3984	19299.8320
25520.0430	28970.3516	31124.6914	33279.0391	31422.3086
249.0538	3459.0190	3574.9673	5027.7773	6920.1055
5509.9375	3501.7344	7032.7305	10563.7344	8325.9023
151.9908	2110.9453	2395.3779	3485.6541	4912.4141
4740.3672	4053.8164	3331.2390	2608.6602	1198.5388
68.4406	950.5466	1078.6250	1569.5708	2212.0322
-2821.2302	-7548.2773	-4452.1172	-1355.9531	-4699.3633
77.9218	1082.2288	292.7456	-39.8054	-498.6331
-768.0659	-954.1343	-1962.8853	-2971.6377	-5697.7227
691.6521	8952.8047	11695.4414	17485.0352	25935.6172
35910.5195	42280.7305	46533.6055	50786.4922	48301.4844
863.8396	11181.6133	13367.8203	19460.8164	28379.4375
38258.7227	44297.6016	47714.2109	51130.8320	48114.2187
737.0183	9540.0273	11000.4219	15827.1367	22902.0078
30562.6094	35155.3437	37576.2539	39997.1680	37500.6406
636.5015	8238.9297	9378.2812	13434.8125	19383.9297
25769.3398	29568.0312	31506.4336	33444.8437	31307.0820
285.4329	3694.6692	3734.9395	5121.8555	7168.4180
5736.8672	3729.4609	7193.1289	10656.8086	8289.9531
165.9182	2147.6594	2441.7124	3496.4299	5043.3125
4847.0430	4164.2383	3424.3699	2684.5000	1200.1301
75.2615	974.1914	1107.5757	1586.0029	2287.6780
-2727.0273	-7467.9961	-4379.9922	-1291.9805	-4725.8086
82.3335	1065.7312	294.9490	-23.4378	-465.8586
-728.1216	-917.2961	-1942.9148	-2968.5352	-5718.8984
632.5515	8884.8203	11719.3750	17425.4062	26170.3711
36398.3750	42874.6523	46789.8750	50705.1094	47762.8164
792.4224	11130.3672	13451.1367	19490.0508	28794.0273
38985.6680	45158.8945	48222.6641	51286.4453	47784.5586
677.0032	9509.1875	11087.1914	15881.5625	23287.1328
31207.0781	35910.3828	38047.2383	40184.0977	37298.5352
584.9585	8216.3281	9457.9219	13490.5703	19725.7187
26333.1367	30226.2891	31925.3320	33624.3828	31158.8477
254.2822	3571.6475	3724.1326	5127.9570	7318.6250
5952.7422	3973.2891	7395.0742	10816.8711	8229.3750
153.6858	2158.6702	2473.1887	3522.1462	5144.6172
4993.5000	4327.6875	3574.5574	2821.4258	1218.6956
69.8112	980.5688	1123.4377	1599.9238	2336.9258
-2663.9194	-7390.1875	-4333.7227	-1277.2539	-4703.9453
74.8821	1051.7935	296.1514	-12.2991	-441.6975
-709.3831	-903.9500	-1887.4121	-2870.8760	-5679.1094
738.6755	8597.8477	12035.2578	17637.3164	26162.3398
36375.2852	43513.0391	47037.8320	50562.6367	47301.9375
927.9119	10800.4727	13862.3789	19815.8828	28937.6758
39158.2109	46068.2852	48722.7695	51377.2617	47527.7422
793.7354	9238.7187	11441.8125	16175.4844	23452.5352
31406.3594	36705.0703	38512.7891	40320.5156	37153.0312
686.1252	7986.1875	9765.2812	13749.0703	19881.1953
26520.7734	30918.2656	32339.7852	33761.3086	31057.3789
283.5557	3300.4587	3798.2175	5239.7109	7473.8516
6124.3359	4257.0664	7618.9570	10980.8555	8243.66
189.2528	2202.8167	2639.6333	3691.9641	5315.2617

Figure C-1-Continued.

5085.1016	4425.0469	3677.4109	2929.7734	1291.0413
84.0842	978.7024	1172.7783	1640.3259	2361.5496
-2607.8044	-7356.6953	-4264.4805	-1172.2578	-4650.6094
89.2341	1038.6440	301.5513	-15.8805	-442.1111
-701.7070	-901.9805	-1916.8628	-2931.7466	-5660.4922
802.3523	8550.8320	12241.5508	17455.1250	26299.4648
36374.0937	43924.5312	47304.5937	50684.6641	47006.8398
1010.3875	10767.9023	14155.2422	19701.2695	29237.0078
39352.2187	46736.5703	49234.8086	51733.0508	47432.1797
865.2419	9221.0586	11701.6719	16111.2031	23743.1523
31622.9570	37308.2812	38986.5273	40664.7812	37133.0547
748.2380	7974.1250	9992.6797	13703.5195	20142.5117
26723.0195	31449.0781	32760.5703	34072.0703	31060.3555
325.7380	3471.4561	4015.5176	5360.2969	7738.0703
6285.0781	4395.9336	7804.6172	11213.3125	8280.1055
211.1967	2250.7656	2740.3621	3722.9448	5438.5312
5111.7891	4430.3164	3749.9751	3069.6328	1381.9531
92.3420	984.1072	1198.1746	1627.7922	2377.9014
-2576.5820	-7352.2656	-4221.6328	-1090.9961	-4596.8281
95.5046	1017.8120	297.7590	-19.3476	-440.0674
-703.6890	-918.4780	-1900.4873	-2882.4983	-5612.6250
618.7979	8667.0742	12456.2617	17443.2500	26541.6914
36132.2930	43929.4297	47407.6758	50885.9297	46994.8828
780.9536	10938.2773	14462.3359	19777.5586	29649.0391
39282.6016	46966.3281	49566.1289	52165.9336	47617.5703
669.4297	9376.2383	11975.0977	16203.0781	24124.4883
31627.4961	37560.6406	39315.1367	41069.6406	37332.6289
579.1125	8111.2305	10232.2227	13790.8086	20480.5391
26745.9414	31683.7852	33058.5391	34433.3008	31246.5039
266.9634	3739.1726	4242.2500	5513.4883	7989.4727
6443.7070	4578.1055	7977.9453	11377.7969	8384.5078
164.8973	2309.6021	2843.0671	3801.5259	5616.1211
5173.7344	4474.5469	3811.2388	3147.9297	1481.1394
69.6869	976.0566	1201.5032	1606.5569	2373.4189
-2568.1816	-7382.3086	-4247.7852	-1113.2578	-4546.9883
70.5092	987.5740	284.0999	-30.6964	-447.8386
-713.4729	-943.6934	-1909.9185	-2876.1450	-5555.1523
433.2991	9036.1367	12740.8984	17871.4922	26872.8672
36336.6172	43789.5586	47254.3516	50719.1562	47110.4766
547.9045	11426.1523	14858.9961	20356.7891	30156.5820
39692.6875	47032.2617	49623.7852	52215.3164	47927.8789
470.0715	9803.0000	12325.9609	16708.8945	24582.8281
32017.2578	37679.9023	39425.7266	41171.5547	37629.7383
406.7803	8483.1055	10538.9570	14231.0234	20883.7383
27094.3359	31805.5742	33172.8008	34540.0312	31513.9297
175.8434	3667.0859	4272.7266	5644.9102	8162.9336
6664.5273	4797.3164	8147.1445	11496.9805	8471.6719
114.4766	2387.3252	2914.7532	3913.3457	5720.9219
5218.5547	4427.4102	3862.0396	3296.6680	1555.1589
47.5014	990.6062	1209.4592	1623.8193	2373.8623
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45.7855	954.8237	261.1692	-54.7185	-475.2751
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378.9541	9569.1484	12888.1602	18495.8398	27022.4023
35721.6133	43311.0078	46937.3164	50563.6367	47302.2578
479.9956	12120.5937	15102.6016	21166.1133	30455.6875
39197.5312	46721.5664	49494.3008	52267.0469	48310.7617
412.1238	10406.7344	12552.7109	17406.3789	24870.2031
31674.3008	37494.3242	39383.9687	41273.6211	37983.1836
356.7334	9008.0430	10740.4648	14835.3594	21141.3594

26821.8125	31668.9570	33157.5508	34646.1484	31828.1406
140.6162	3550.7659	4234.8008	5849.8984	8337.0117
6729.5117	4912.9414	8250.7578	11588.5820	8561.3047
98.4419	2485.8015	2964.0544	4094.2114	5834.6016
5235.0547	4472.8672	3945.2173	3417.5664	1651.0452
40.2738	1016.9736	1212.6333	1674.9954	2387.0117
-2574.5803	-7456.1875	-4249.9766	-1043.7656	-4479.9609
37.2957	941.7725	245.9324	-71.8729	-496.5894
-771.7246	-1022.8840	-1922.2058	-2821.5293	-5447.2461
386.6921	9990.6133	12724.8672	19009.0977	27396.3906
35314.4258	43156.7070	46762.4492	50368.2031	47799.8906
490.5129	12672.9375	14969.5664	21842.4336	31002.5820
38916.9258	46747.7852	49507.6133	52267.4492	49001.4922
421.4324	10888.1680	12462.0312	17992.5781	25358.6328
31500.9375	37575.6641	39454.2266	41332.7969	38578.0508
364.8789	9427.0469	10669.0312	15344.2695	21569.5234
26691.7266	31756.6758	33236.0391	34715.4062	32344.2461
162.5797	4200.4219	4440.3359	6229.5859	8607.7031
6834.0156	5045.6758	8373.0430	11700.4219	8748.9531
96.8910	2503.2847	2898.8081	4201.8984	5937.9336
5229.0273	4508.9141	3980.8267	3452.7383	1721.8650
39.5024	1020.5886	1181.8437	1713.1157	2420.8950
-2538.3394	-7492.1289	-4277.6797	-1063.2227	-4439.3828
36.3394	938.8667	241.9217	-61.8671	-477.7178
-766.3655	-1053.3694	-1943.8264	-2834.2849	-5368.0078
236.1017	10178.3398	12061.8008	20259.8281	27742.2773
35421.3437	42905.9023	46531.3047	50156.7148	48246.3164
299.8645	12927.1562	14232.7344	23361.3242	31512.9648
39192.3516	46656.5195	49447.9453	52239.3828	49634.8906
257.7788	11112.8398	11863.1719	19271.1406	25815.9609
31774.8164	37559.1875	39462.9883	41366.7969	39127.0156
223.2325	9623.5469	10160.8086	16443.0859	21970.8398
26939.7187	31760.6719	33261.5508	34762.4375	32821.4648
102.8387	4433.3750	4321.2617	6790.5859	8889.7773
7060.1953	5191.8477	8488.3633	11784.8906	8848.4258
59.7456	2575.6306	2777.8860	4528.3203	6080.4844
5282.3867	4455.2891	3986.8579	3518.4258	1714.9692
23.8574	1028.4905	1109.2544	1808.2322	2428.0354
-2540.9919	-7496.0664	-4248.6211	-1001.1680	-4452.5820
21.8892	943.6440	226.9057	-65.9433	-481.0076
-778.1406	-1071.0007	-1973.0061	-2875.0132	-5341.9062
-6.9350	10451.3047	10995.2578	21234.8555	27993.2734
35559.6016	42781.1016	46401.3242	50021.5547	48695.6523
-8.8171	13287.7656	13014.0781	24568.5547	31909.7148
39491.0000	46689.3359	49484.0977	52278.8711	50264.8047
-7.5832	11428.2500	10860.9687	20295.0742	26178.5937
32064.2695	37639.0117	39545.1562	41451.3086	39671.8711
-6.5681	9898.3984	9306.5977	17325.4258	22291.1016
27199.8906	31844.9180	33347.9023	34850.8906	33294.7461
-2.6144	3940.0354	3707.9158	6905.0117	8886.0547
7103.1797	5251.4258	8519.2344	11787.0508	8919.8320
-1.7212	2593.9028	2519.2490	4742.6016	6148.1484
5372.0625	4543.8828	4068.8052	3593.7266	1753.7773
-0.6866	1034.7556	1004.9753	1891.9119	2452.6104
-2524.3677	-7476.8633	-4241.6289	-1006.3867	-4460.7539
-0.6206	935.2720	197.8759	-78.1171	-492.4675
-772.4280	-1044.8984	-1892.8301	-2740.7629	-5317.6250
-106.9460	10407.5898	9954.4297	21529.0078	27876.1289
35601.0820	42839.8633	46286.1719	49732.4922	49108.3594
-136.0885	13243.6406	11810.2070	24980.7891	31878.6055

Figure C-1-Continued.

39665.2500	46910.2266	49527.2227	52144.2227	50849.5430
-117.0900	11394.7734	9865.7109	20659.8437	26187.7773
32247.5586	37866.9648	39630.6133	41394.2695	40179.3906
-101.4302	9870.8164	8456.6680	17644.2617	22309.6211
27368.3984	32053.4375	33436.3047	34819.1758	33736.0000
-40.9746	3987.5007	3416.1394	7127.4687	9012.0039
7287.0859	5462.6562	8656.5391	11850.4297	8994.1992
-26.2416	2553.7358	2321.0586	4940.2266	6330.4805
5504.3906	4603.1367	4105.2500	3607.3633	1763.7747
-10.6565	1037.0513	942.5632	2006.1860	2570.7571
-2445.1218	-7427.6133	-4218.8242	-1010.0312	-4488.4336
-9.7174	945.6638	190.1316	-57.2041	-463.3962
-749.0676	-1024.5103	-1903.0981	-2781.6875	-5308.0234
-207.7135	10056.0195	9221.3906	21762.6641	28940.0547
35710.4258	42961.5312	46290.2656	49619.0117	49439.9844
-264.5002	12805.2344	10945.5977	25296.3633	33192.6328
39921.6992	47188.1992	49684.0742	52179.9570	51341.1016
-227.6471	11021.0664	9144.5156	20934.9062	27300.2852
32500.1992	38137.6367	39803.2227	41468.8125	40611.0352
-197.2241	9548.1992	7838.7617	17883.4531	23267.6016
27596.5547	32297.0156	33596.9453	34896.8828	34112.7539
-91.0045	4405.7969	3405.0818	7609.3164	9763.0117
7730.0898	5801.2344	8826.8906	11852.5547	9050.8398
-52.9006	2561.0720	2168.8542	4997.8125	6545.4297
5615.3516	4760.8711	4235.9570	3711.0430	1736.8848
-21.7008	1050.6013	889.7063	2050.2009	2685.0623
-2317.9993	-7352.2656	-4155.1836	-958.0977	-4496.6562
-19.0226	920.9409	180.2937	-20.8422	-399.9451
-692.1294	-993.6316	-1881.3054	-2768.9810	-5300.6367
-227.2407	9972.2070	9515.3984	22094.2969	30888.1094
36234.7695	43415.7148	46393.0352	49370.3672	49780.5000
-289.5273	12705.5898	11297.9570	25721.7227	35520.8398
40641.6602	47819.8477	49939.6523	52059.4648	51831.5898
-249.2500	10938.0625	9439.3594	21299.5508	29247.2187
33130.4453	38690.8086	40053.0859	41415.3711	41039.1914
-215.9600	9477.1680	8091.6016	18198.7578	24936.8164
28145.4258	32778.8203	33822.2148	34865.6172	34485.5781
-92.8680	4075.4084	3371.2000	7507.0781	10220.1523
7945.9648	6074.0156	8961.0820	11848.1602	9100.0820
-56.6060	2484.0935	2160.9373	4887.8633	6722.1055
5663.2734	4891.1289	4321.8437	3752.5586	1748.6067
-22.8449	1002.5225	872.1047	1972.6287	2712.8875
-2222.8232	-7271.0547	-4108.4687	-945.8789	-4539.3047
-21.0049	921.7778	178.4635	-20.0420	-400.3489
-650.3643	-933.3027	-1792.9294	-2652.5579	-5294.9727
-318.0300	9771.7695	9729.3477	22236.7734	32169.9180
36877.6016	44145.3750	46721.5898	49297.8086	49851.4648
-405.3755	12455.5430	11557.0156	25926.0859	37082.2227
41473.9883	48744.9258	50427.4922	52110.0664	52029.4922
-349.0500	10724.8906	9656.9531	21481.1992	30562.7656
33845.7812	39478.4180	40486.1562	41493.8984	41232.3594
-302.4524	9293.1328	8278.4336	18357.7187	26067.6953
28764.5547	33458.2930	34201.1797	34944.0703	34659.9102
-119.1774	3661.8376	3285.7639	7301.6328	10381.9922
8074.1680	6326.8633	9105.6016	11884.3477	9108.9453
-80.9216	2486.3916	2181.1279	4814.9102	6817.5234
5788.1562	5160.6172	4483.6484	3806.6797	1698.1760
-32.5868	1001.2600	878.3320	1938.9480	2745.3916
-2134.0195	-7161.5742	-4036.2349	-910.8867	-4585.6016
-29.8172	916.1628	178.4426	-16.0909	-392.5725

-625.5889	-902.0344	-1820.3142	-2738.5955	-5330.5781
-650.7454	9755.1914	9185.3945	20968.8125	32467.2305
37657.2773	45474.2344	47424.8086	49375.3867	50235.2852
-829.7349	12438.3867	10925.1328	24490.7422	37502.5508
42432.7344	50322.9570	51314.0195	52305.0898	52541.0508
-714.5491	10711.6602	9133.6523	20306.4336	30935.7734
34655.2344	40792.1914	41237.8008	41683.4180	41670.6641
-619.1904	9282.1562	7831.2695	17358.2266	26394.0742
29460.9023	34582.8750	34848.7617	35114.6523	35039.1172
-271.8809	4075.7109	3251.5789	7087.9023	10663.3164
8426.1562	6776.7930	9367.5586	11958.3320	9179.3672
-162.0571	2429.3638	2044.4910	4528.3906	6882.5117
5920.2383	5370.9570	4638.3359	3905.7187	1694.8271
-66.8085	1001.5125	842.8479	1866.8442	2837.3381
-2037.3054	-7054.0664	-3929.1255	-804.1758	-4616.5273
-62.2879	933.7454	173.4234	-7.4535	-386.4263
-600.0061	-855.4414	-1780.2241	-2705.0083	-5318.3672
-729.5869	9423.1367	8087.1094	19841.0000	32380.1562
38568.0742	46705.6875	48171.7031	49637.7266	50360.3789
-930.4690	12017.6719	9625.1445	23203.3828	37468.4492
43525.9961	51783.8828	52232.9180	52681.9570	52769.1133
-801.3792	10350.3867	8048.7383	19248.9453	30930.5586
35570.3633	42008.3281	42011.0273	42013.7344	41880.3477
-694.4585	8969.4297	6901.6133	16457.2930	26396.6758
30245.7539	35623.8242	35513.1875	35402.5547	35224.7969
-318.3315	4111.4805	2902.7156	6747.9883	10649.9453
8643.2344	7073.4648	9569.5508	12065.6445	9136.5312
-176.7803	2283.2444	1792.2786	4297.3672	6916.3125
6112.1406	5616.9492	4813.4883	4010.0273	1676.2612
-73.5442	949.8755	745.6243	1787.7925	2877.3269
-1979.8948	-6937.2031	-3840.2563	-743.3008	-4674.4453
-74.2323	958.7632	164.6137	10.9770	-363.5061
-577.2283	-820.1306	-1705.8586	-2591.5884	-5329.1016
-804.6228	8885.3555	6817.1328	18933.7852	32537.4570
39104.3359	48283.2383	49197.1758	50111.1172	50559.3750
-1026.3096	11333.4141	8112.4258	22159.2812	37706.6836
44186.9531	53618.7461	53443.7500	53268.7539	53060.2500
-883.9797	9761.6836	6782.9648	18388.0000	31146.5547
36128.9570	43524.6445	43016.0352	42507.4258	42136.0391
-766.0559	8459.4648	5815.9687	15722.7734	26586.9805
30726.4492	36918.3320	36372.5586	35826.7891	35447.8867
-303.0459	3346.5000	2333.7180	6332.3984	10732.2305
8854.0352	7567.2656	9916.0312	12264.8008	9162.6289
-183.9078	2030.8723	1494.6641	4110.7344	7023.5391
6243.1055	5879.6953	5011.2422	4142.7891	1667.9373
-78.8656	870.9036	640.9604	1762.8171	3011.9226
-1851.5288	-6838.6562	-3772.2737	-705.8828	-4678.7773
-89.3950	987.1787	154.5713	44.5949	-309.8650
-533.3743	-792.5112	-1738.2200	-2683.9302	-5359.8320
-850.2205	8178.5508	5644.4023	18668.5742	33031.8828
40006.9102	50431.3750	50575.3437	50719.3164	50964.3984
-1084.5642	10432.7812	6710.5859	21854.4648	38325.5352
45250.4375	56076.8789	55030.9492	53985.0195	53553.3945
-934.1951	8986.3320	5608.2734	18136.2578	31673.6133
37012.9883	45543.6641	44321.9687	43100.2734	42547.9023
-809.5852	7787.6680	4807.9141	15507.8125	27041.7461
31482.7461	38638.2227	37485.7383	36333.2539	35800.9844
-304.7549	2931.5381	1905.6736	6221.1875	10925.2383
9098.6719	8056.6055	10288.3750	12520.1523	9217.7812
-194.5465	1871.4065	1233.0063	4037.3948	7102.6406

Figure C-1-Continued.

6350.6992	6146.3242	5189.5234	4232.7227	1684.7319
-82.9195	797.6304	525.5320	1720.8188	3027.2876
-1776.6438	-6733.7578	-3679.0627	-624.3594	-4695.8164
-104.7851	1007.9622	134.1610	53.2536	-299.6272
-507.0991	-758.2939	-1693.8521	-2629.4119	-5359.0430
-1292.2144	7260.1172	4592.0312	18203.3398	33012.0742
40544.6719	52552.5625	51603.7695	50654.9805	51208.7617
-1649.2205	9265.9023	5452.4883	21308.9922	38337.3750
45883.0781	58493.3242	56231.8242	53970.3242	53862.6797
-1421.0376	7983.8906	4554.2109	17682.7617	31695.4336
37538.5039	47525.0469	45314.9648	43104.8867	42809.3750
-1231.6011	6919.5703	3903.4216	15119.6914	27064.0977
31932.2539	40325.0703	38333.7148	36342.3633	36026.0586
-553.2151	3108.1587	1620.6462	6166.1992	10922.9687
9183.8672	8458.4727	10570.1484	12681.8320	9217.7812
-292.3640	1642.6045	994.7551	3910.2693	7058.1172
6357.4141	6358.4375	5357.4609	4356.4844	1678.0830
-127.4353	715.9768	433.5930	1704.4053	3076.4878
-1699.1990	-6662.4453	-3629.1096	-595.7656	-4707.8789
-182.7977	1027.0220	122.1957	89.9634	-233.3069
-476.7107	-772.7336	-1680.5847	-2588.4370	-5347.6172
-1339.6641	6676.0000	3863.5076	17537.4102	32528.3984
41473.7187	54358.3945	52940.1719	51521.9492	51864.0977
-1710.5029	8524.0156	4584.8047	20531.7969	37799.1328
46942.4492	60544.5664	57738.2227	54931.8789	54589.1211
-1474.2588	7346.7305	3828.4888	17038.4062	31258.5703
38407.7891	49205.1484	46544.8047	43884.4609	43397.8906
-1277.8259	6367.8398	3281.0659	14568.8477	26693.5547
32672.5117	41754.8437	39379.1016	37003.3633	36524.9375
-537.4773	2678.4316	1314.4363	5777.2227	10523.9180
9254.8828	8864.9141	10899.9609	12935.0156	9328.5898
-305.3081	1521.4539	838.2153	3770.8938	6959.8672
6491.5117	6639.7500	5588.4922	4537.2344	1736.8352
-135.0121	672.8110	370.6724	1667.5513	3077.7666
-1683.2903	-6604.2344	-3560.2131	-516.1836	-4700.5898
-210.2615	1047.8042	109.5957	98.2933	-221.8406
-469.5381	-761.8350	-1685.1328	-2608.4319	-5340.3789
-1271.4854	6325.1992	3150.8667	16570.4297	31077.4258
41943.6484	56119.5547	54274.5742	52429.5977	52195.1914
-1623.9534	8078.6055	3739.8406	19405.0547	36125.1328
47455.1133	62529.6719	59225.3750	55921.0742	54958.7148
-1399.9563	6964.2969	3123.2012	16105.2734	29878.3789
38820.6484	50826.1797	47753.7500	44681.3164	43698.0234
-1213.4907	6036.6953	2676.7041	13771.5391	25516.2266
33021.6758	43132.8008	40405.1055	37677.4062	36779.5391
-426.3179	2120.7839	1036.3174	5431.3906	10167.4297
9399.5469	9373.3633	11286.3008	13199.2422	9348.7891
-289.9824	1442.5627	698.7068	3656.1223	6838.1797
6568.0039	6816.0977	5752.4258	4688.7578	1784.0654
-130.7842	650.6062	315.1218	1648.9390	3084.0713
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-213.3609	1061.3967	93.6309	90.4610	-241.0896
-465.3220	-726.2720	-1631.6208	-2536.9709	-5296.5977
-1350.8079	5939.4844	3157.0110	14900.3203	29690.3867
42106.8008	57108.1289	55177.2812	53246.4336	52032.7383
-1725.3132	7586.1797	3746.2415	17447.9570	34514.3359
47613.5391	63635.7109	60216.3750	56797.0391	54792.2187
-1487.3894	6540.0312	3128.2207	14480.4883	28546.6719
38941.3633	51726.6406	48554.6328	45382.6250	43566.9844
-1289.2866	5668.9766	2680.9011	12382.0391	24379.1328

33121.6016	43897.3906	41083.2930	38269.1953	36669.7266
-528.3579	2323.1831	1109.3391	5133.4062	10118.0625
9584.9297	9640.2109	11577.8633	13515.5195	9347.7969
-314.0544	1380.8940	726.7559	3424.2112	6816.6992
6735.3125	7067.4102	5956.2695	4845.1328	1839.5188
-144.3517	634.7124	334.0452	1573.9006	3133.2219
-1571.6311	-6372.9648	-3381.5237	-390.0742	-4677.5898
-238.3116	1047.8530	102.7797	114.5079	-172.7153
-419.7258	-692.5034	-1626.8772	-2561.2522	-5252.0781
-1598.8413	5614.5469	3128.5432	12753.4258	29053.9492
42004.2148	58123.9766	56602.4844	55080.9961	52342.1406
-2041.9333	7170.5234	3709.6477	14927.1484	33766.3594
47468.3633	64752.1641	61746.5820	58741.0000	55106.0547
-1760.2925	6181.5039	3096.6252	12385.9180	27925.2227
38812.8320	52629.1328	49780.5352	46931.9336	43812.9180
-1525.8230	5358.1328	2653.5010	10590.2344	23847.5547
33009.2539	44661.7187	42118.0781	39574.4336	36875.5781
-732.0413	2570.6619	1132.0645	4409.8359	9794.4648
9621.5078	10174.5547	12047.9102	13921.2734	9417.2461
-381.7214	1340.4668	718.7834	2910.8884	6607.7852
6715.1211	7329.1562	6214.8945	5100.6328	1900.0933
-174.2985	612.0725	328.2048	1329.1460	3017.1929
-1545.8142	-6225.4648	-3269.7678	-314.0625	-4657.0547
-310.1753	1089.2224	109.1367	105.1501	-177.6274
-379.1814	-609.3474	-1550.0864	-2490.8267	-5241.5352
-1727.8474	5451.5547	3435.6816	10694.2891	28417.4648
41337.4766	59357.7461	58642.2656	57926.7891	53979.5547
-2207.1663	6963.8594	4071.8894	12510.5977	33009.3008
46670.8164	66090.6250	63916.9687	61743.3086	56800.7383
-1903.0405	6004.3086	3398.3896	10378.5937	27293.1055
38145.9297	53705.2383	51512.9727	49320.7070	45151.5937
-1649.6226	5204.7461	2911.8809	8873.2344	23305.8594
32437.5078	45571.3281	43578.4023	41585.4805	37999.4258
-633.9834	2000.2896	1138.7720	3481.5977	9161.2969
9284.1836	10552.5586	12565.8437	14579.1367	9719.1328
-400.1929	1262.6543	762.1389	2354.9207	6232.7461
6519.6992	7611.0625	6489.3047	5367.5469	2073.4980
-179.7704	567.1960	342.3599	1057.8533	2799.8105
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-344.6155	1087.3015	117.3474	71.3225	-230.8560
-369.9910	-554.7759	-1499.1858	-2443.5969	-5236.6133
-1800.0088	5409.7422	3672.2393	9123.4531	25889.5391
40953.8125	60376.0703	59669.0703	58962.0703	53709.2500
-2299.1265	6909.7891	4355.4766	10671.1172	30048.3750
46152.3828	67167.5625	64981.1133	62794.6602	56470.4922
-1982.2747	5957.5234	3636.4373	8852.2266	24836.4336
37693.5859	54561.7930	52353.2109	50144.6289	44875.3867
-1718.2808	5164.1172	3116.2810	7568.1680	21205.4883
32043.9766	46292.3320	44283.7187	42275.1094	37762.5430
-586.3132	1762.1047	1154.9470	2850.9692	8061.5195
8915.3828	10717.9531	12792.8398	14867.7305	9670.8711
-425.7593	1279.5764	801.3796	1960.9194	5517.7422
6305.3086	7763.8359	6669.6094	5575.3828	2134.0227
-186.0559	559.1719	350.2009	856.9180	2411.2424
-1700.3435	-5992.8672	-3005.6702	-18.4648	-4620.7109
-361.7827	1087.3015	123.5896	32.2793	-335.6663
-429.9795	-570.0481	-1534.6479	-2499.2495	-5190.4180
-1715.3516	5421.0039	4279.2422	8021.4141	21487.4687
39117.3555	60059.3672	60080.5664	60101.7695	54252.7695
-2189.9819	6920.9727	5087.5898	9386.0234	24911.8359

Figure C-1-Continued.

43963.6797	66738.0000	65337.0586	63936.1094	56979.0156	-473.2305	-578.4546	-1486.8691	-2395.2852	-4957.1289
-1887.7114	5965.7109	4252.4492	7788.0586	20581.3984	-1423.4048	5469.6641	5856.6562	8502.9609	11986.5273
35866.1875	54187.8242	52610.9648	51034.1055	45260.7031	23044.6602	37071.9648	56932.5273	76793.1250	60053.4648
-1636.1843	5170.8125	3645.6846	6658.9805	17569.6055	-1814.3245	6971.8359	7014.9141	9949.1719	13796.4805
30478.1328	45967.2969	44492.6328	43017.9727	38080.6836	25684.9180	40882.7148	60985.6523	81088.6250	62615.4180
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8241.4062	10744.2656	13068.7148	15393.1680	9818.1172	20883.6445	33094.1016	48818.5742	64543.0703	49603.3398
-410.7627	1298.1282	974.3379	1806.1897	4807.3633	-1354.1565	5203.5664	5051.3633	7061.7109	9690.4102
5938.7500	7572.9844	6774.7422	5976.5039	2245.1267	17724.5039	28042.3008	41194.4648	54346.6484	41690.5781
-181.1496	572.4849	429.6907	796.5442	2120.0862	-677.7202	2604.2500	2157.4229	2802.2568	3629.6453
-1864.2397	-6006.4102	-2982.0139	42.3906	-4561.5117	4038.9248	4968.5977	11750.6758	18532.7695	11403.4180
-336.5867	1063.7112	155.6593	17.5443	-373.7449	-346.9104	1333.0601	1577.2556	2368.3032	3414.7236
-447.1355	-558.3862	-1501.0151	-2443.6458	-5128.0703	3633.6475	4320.7461	5892.5859	7464.4297	3409.4553
-1581.8716	5461.9062	4678.5430	7489.5117	17731.9453	-129.8393	498.9285	590.3242	886.3921	1278.0393
35738.9258	55854.5820	59501.8750	63149.1758	54409.3945	-2652.1724	-6924.0977	-3212.0925	499.9219	-4341.6211
-2018.6260	6969.9375	5577.8242	8768.3008	20529.3789	-285.2620	1096.1655	297.8696	-25.5165	-481.0027
40070.4219	61975.6992	64529.0977	67082.5000	57063.8008	-552.9106	-696.0586	-1598.0957	-2500.1343	-4846.0742
-1739.5894	6006.4766	4668.2734	7277.7383	16950.9531	-1443.3127	5483.4883	6527.0195	9410.6328	12064.4492
32657.9219	50291.7734	51904.1562	53516.5430	45304.3672	19625.2422	26976.7930	52609.6250	78242.5000	64337.6406
-1507.6782	5205.7305	4004.0806	6223.3750	14467.4023	-1839.1221	6987.2617	7804.3320	10986.9414	13851.1719
27741.8633	42653.1562	43877.1562	45101.1641	38109.7344	22812.3828	31530.3672	56969.3516	82408.3750	66915.6875
-737.8147	2547.5366	1609.0332	2340.9417	5206.2031	-1583.9238	6017.7031	6542.1484	9111.1758	11397.0664
7069.6133	9350.1484	12844.6328	16339.1250	10019.5469	18916.5391	26234.3242	45882.3398	65530.3867	52961.1719
-390.2227	1347.3665	1123.1255	1785.2224	4208.4570	-1372.4463	5214.2500	5614.6445	7788.8398	9715.0039
5393.3750	6896.5234	6687.3633	6478.2031	2524.3643	16168.8320	22450.2734	38803.9336	55157.6172	44496.7383
-171.0597	590.6372	492.3381	782.5776	1844.8376	-599.2361	2276.6404	2188.8564	2886.2251	3462.1997
-2076.0535	-6119.4336	-2951.7974	215.8477	-4503.3516	3130.3328	2765.0898	10600.4375	18435.7969	11887.5273
-309.2261	1067.7004	197.1244	21.5970	-369.6479	-345.7319	1313.5183	1715.0071	2551.1074	3339.7195
-463.7866	-585.2903	-1499.2502	-2413.2117	-5110.0937	3112.2617	2851.6211	5124.4141	7397.2148	3481.8000
-1825.6929	5555.2109	5370.2852	7257.5898	14821.0820	-117.2746	445.5542	581.7419	865.3530	1132.8557
30996.2109	49944.5000	59374.1484	68803.8125	54716.5547	-3205.8875	-7510.4492	-3477.5967	555.2656	-4407.7109
-2329.6096	7088.5273	6422.2109	8502.2656	17130.6562	-292.5020	1111.2852	307.3125	-82.4563	-569.4424
34674.5820	55320.7578	64142.3398	72963.9375	57289.9609	-701.3096	-825.7000	-1661.9070	-2498.1152	-4779.5898
-2007.6069	6108.7383	5382.7930	7059.6406	14134.8203	-1278.3088	5604.2266	7449.6250	10516.1250	12447.9414
28234.3437	44859.9336	51515.2422	58170.5664	45455.3477	16778.0859	18111.0234	47338.8320	76566.6875	66885.1875
-1739.9548	5294.3281	4619.3750	6037.7422	12060.8398	-1628.0427	7137.4922	8888.6367	12246.3281	14251.5000
23976.1562	38036.5586	43523.8906	49011.2383	38227.4453	20324.8906	22767.4805	51592.1562	80416.8750	69375.2500
-639.2034	1944.9658	1650.9287	2136.8521	4240.0312	-1401.8396	6145.7969	7444.7812	10145.0039	11712.9062
5959.5859	8212.3398	12861.4570	17510.5820	10313.5586	17206.3789	19626.1328	41752.6172	63879.1406	54852.2734
-432.5730	1316.2319	1302.0417	1771.8037	3634.2737	-1214.5762	5324.8164	6387.3711	8669.3750	9980.0430
4734.4297	6258.1641	6612.2539	6966.3477	2820.5937	14822.8086	17017.6562	35381.7461	53745.8633	46067.2812
-183.2052	557.4561	551.4460	750.4016	1539.2029	-471.6697	2067.8445	2400.7063	3213.9663	3662.3455
-2267.1018	-6276.2383	-2927.1626	421.9219	-4447.4062	2477.9314	850.8633	9228.8984	17606.9531	11940.7070
-355.3777	1081.3423	245.9746	3.7706	-423.6826	-300.2896	1316.4983	1938.5803	2831.3489	3428.4185
-457.1306	-531.4771	-1468.6008	-2405.7261	-5047.1055	2800.3757	1672.0781	4282.3477	6892.6250	3368.9233
-1647.4746	5436.0039	5907.6211	7631.1875	12538.3750	-87.2854	382.6675	563.4888	822.9905	996.5415
26353.9180	44182.2109	59183.1250	74184.0625	57207.6211	-3848.0801	-8005.2891	-3729.8359	545.6328	-4462.8203
-2101.4258	6933.8594	7078.8203	8940.6914	14463.9258	-256.1770	1123.1047	321.1724	-135.6018	-638.6599
29411.7695	48837.9687	63675.0977	78512.2500	59780.9570	-853.6331	-916.1147	-1675.6941	-2435.2749	-4663.7070
-1810.6694	5974.4805	5938.7773	7424.6367	11924.7578	-939.4211	5714.4414	7605.6680	11120.5469	13191.7461
23926.1484	39570.6328	51058.4766	62546.3437	47397.1523	15300.3008	11759.6250	40123.9766	68488.3750	65067.0742
-1569.1792	5177.6602	5098.2656	6350.2344	10172.0625	-1195.2593	7270.6875	9045.5586	12907.7422	15056.6523
20310.5820	33541.6719	43112.1953	52682.7383	39849.1836	18733.6719	15493.7773	43603.0234	71712.3125	67289.0625
-611.9343	2019.1372	1908.4929	2337.9807	3699.9236	-1028.7041	6257.5430	7565.9492	10678.2695	12358.9414
4860.2812	6760.6875	12490.7734	18220.8711	10903.5391	15940.0195	13635.6719	35267.5000	56899.3633	53144.7227
-400.5576	1321.6790	1571.2136	2089.6960	3500.2192	-891.1401	5420.7500	6488.1914	9120.5586	10525.6523
4146.5234	5424.1992	6358.0039	7291.8164	3141.8906	13766.4570	11924.3633	29888.1836	47852.0312	44613.9570
-166.1901	548.3606	651.8916	867.0085	1452.2307	-392.1555	2385.4578	2598.2263	3508.3955	3928.7832
-2334.4966	-6476.6797	-3000.5457	475.5977	-4400.5195	1861.6973	-892.7715	7362.4922	15617.7734	11496.9844
-326.5103	1077.3530	297.4978	-4.7308	-440.0625	-221.5359	1347.5889	1933.1282	2896.8137	3492.7346

Figure C-1-Continued.

2552.3821	669.6289	3212.5293	5755.4336	3096.5320	14588.9961	7124.7344	9164.0977	11203.4687	20834.4375
-56.9930	346.6851	497.3228	745.2434	898.5522	-30.4604	3019.4321	3162.4126	4295.3711	4791.0078
-4671.6562	-8516.9766	-4064.0078	388.9727	-4471.4414	1542.7178	-2648.6641	73.3262	2795.3203	3891.4966
-186.8098	1136.3525	301.3450	-169.5943	-690.5820	-17.2018	1705.1604	2176.2747	3205.0369	3793.9834
-1070.1240	-1054.5510	-1772.1956	-2489.8413	-4562.4023	2315.7292	-578.1729	-577.4336	-576.6914	-1093.1470
-890.2666	5856.1914	8024.6055	12088.4648	14050.7852	-2.8318	280.7078	358.2639	527.6213	624.5754
15055.3555	8207.4805	31145.3242	54083.2070	60746.9961	-6418.8945	-9538.3867	-5519.7891	-1501.1836	-5370.9609
-1131.4119	7442.4492	9510.5273	13981.4883	15983.4258	-10.5545	1046.2283	163.0815	-373.6326	-940.2944
18427.5312	11260.3672	33851.4219	56442.5156	62620.6641	-1715.7827	-1442.3813	-1920.9253	-2399.4700	-5005.6875
-973.2192	6401.8555	7943.2383	11549.4766	13101.5898	247.9984	7258.3711	9825.3711	14684.0078	17683.0625
15606.5742	9971.6133	27350.0703	44728.5547	49399.7383	17045.2148	7345.1758	6305.4648	5265.7578	16868.8086
-842.9143	5544.7070	6808.1836	9859.4297	11152.5703	312.8640	9156.8477	11492.5195	16731.5820	19794.2930
13473.6445	8767.2539	23182.8477	37598.4648	41450.7422	20734.0898	10650.4883	8584.4219	6518.3594	21786.9414
-405.4075	2666.7793	2798.8074	3786.5439	4068.2483	268.1794	7849.0273	9546.6953	13737.2461	16119.4844
1382.7820	-2023.9041	5151.5977	12327.1133	10356.8906	17407.7617	9441.1055	7525.1328	5609.1641	19172.9219
-212.5393	1398.0876	1996.4775	3048.0806	3574.2896	231.9886	6789.8008	8166.6875	11701.2969	13688.8516
2328.0188	-132.4805	1945.0273	4022.5391	2342.5896	15010.9180	8352.3477	6606.3984	4860.4492	16760.6328
-48.2229	317.2114	452.9797	691.5774	810.9690	100.2507	2934.1184	3159.1831	4321.7422	4885.2734
-5520.4297	-8972.5312	-4479.5937	13.3594	-4618.1484	1870.3601	-2138.9414	-786.7842	565.3750	2476.6831
-170.6312	1122.4153	271.4958	-227.1446	-756.9990	62.0949	1817.3818	2247.8630	3255.0400	3836.4871
-1327.6536	-1205.8420	-1845.6990	-2485.5571	-4530.7383	2419.0046	-284.5559	-922.6147	-1560.6719	-1880.6060
-679.9177	6000.9062	8808.0625	12963.8750	14959.0859	9.5398	279.2078	345.3435	500.0779	589.4072
14713.0039	4763.9492	21518.2461	38272.5703	51353.7305	-6071.8008	-9504.9023	-5692.4570	-1880.0039	-5556.1836
-863.1709	7618.2852	10401.0352	14937.5703	16955.0391	34.5604	1011.5078	129.7266	-415.7190	-987.4255
19227.2891	8819.4766	24310.4609	39801.4687	52757.4687	-1641.3770	-1422.6807	-1925.7764	-2428.8730	-5187.2148
-742.1274	6549.9648	8673.9531	12320.1055	13877.4180	436.8037	7736.8086	10172.8359	15022.6836	18280.3594
16056.0391	7645.9844	19572.9219	31499.8828	41567.2578	17805.4414	9198.6602	4972.0312	745.3945	10789.8516
-642.6536	5672.0156	7430.4766	10511.3867	11806.6055	549.4702	9732.3945	11861.9883	17050.7930	20367.8281
13940.6289	6881.0508	16673.0234	26465.0156	34861.3242	21371.5039	12614.6758	6794.4883	974.2891	14718.6797
-273.7412	2416.0220	2872.3623	3907.6089	4266.1250	470.3459	8330.9180	9841.0117	13977.4141	16555.4531
1269.5281	-2564.3008	3132.2500	8828.8164	7904.3359	18001.7773	11226.5742	6043.9922	861.3984	13265.5898
-169.9301	1499.7905	2174.4717	3187.6526	3668.5510	406.6768	7203.1914	8414.6172	11899.1406	14049.4609
2320.0557	-558.4763	894.4187	2347.3164	870.4280	15508.2344	9884.2969	5319.3945	754.4844	11719.6992
-32.9247	290.5913	421.3140	617.6226	710.7993	163.8858	2902.7983	3195.3862	4408.7656	5111.9141
-6406.2891	-9298.5430	-4929.4492	-560.3437	-4944.6172	2367.0413	-1458.8750	-1161.3420	-863.8086	683.1023
-125.0465	1103.6511	242.7140	-296.7620	-838.8440	109.7409	1943.7666	2292.5891	3254.2666	3852.8381
-1599.0295	-1304.6829	-1893.0261	-2481.3706	-4608.5977	2551.3281	84.6096	-1035.7371	-2156.0857	-2843.0996
-496.0618	6280.4648	9220.4961	13517.6484	16044.1875	17.5137	310.2075	365.8765	519.3513	614.8784
16878.1445	6658.2070	16951.1953	27244.2031	36594.3984	-5686.6992	-9391.1328	-5764.0352	-2136.9297	-5625.2305
-628.7979	7960.9883	10848.2773	15515.3008	18114.2578	56.3902	998.8018	122.9410	-412.2871	-986.1455
19772.9727	8481.9062	18354.3672	28226.8477	39038.1602	-1560.3562	-1421.9421	-1954.8079	-2487.6748	-5243.0664
-540.2319	6839.6875	9033.2461	12776.1992	14802.6719	628.8809	7928.4492	10271.8789	14989.0547	19013.5117
16481.4180	7366.1016	14837.3633	22308.6406	31294.0820	18930.7227	11313.1562	5892.4648	471.7656	5276.9844
-467.7017	5921.4062	7734.0781	10894.2461	12586.5312	788.6003	9942.0703	11922.0156	16930.3789	21081.3594
14119.7773	6405.6602	12569.1836	18732.7187	26407.8672	22625.7031	15164.5937	7892.0664	619.5234	7632.7773
-185.3712	2346.9194	2937.3977	4071.0144	4649.7227	674.0354	8497.7227	9871.6914	13851.3242	17101.8750
1362.2131	-2817.4414	1494.8945	5807.2422	5480.0000	19082.6680	13468.2070	7008.7500	549.2773	6920.6992
-127.7372	1617.2358	2224.9783	3192.7607	3735.9727	582.4866	7343.5469	8434.9531	11783.3047	14502.7305
2258.1514	-698.5859	77.9563	854.5000	-223.3210	16435.5000	11826.6367	6154.1523	481.6562	6160.3984
-22.2876	282.1758	388.2148	557.0740	651.8540	260.9087	3289.3374	3391.1956	4524.8945	5381.4414
-6570.8320	-9490.1289	-5256.5781	-1023.0156	-5137.8672	2821.9939	-860.6602	-951.8669	-1043.0742	-540.3838
-85.5653	1083.3123	209.3478	-332.6797	-890.0122	161.4827	2035.8503	2312.9915	3217.1973	3947.3447
-1712.2368	-1413.0779	-1953.0356	-2492.9946	-4799.7812	2817.3591	566.0117	-813.0066	-2192.0273	-3085.4504
-68.6625	6806.2812	9299.2266	14015.8281	16851.5312	26.7939	337.7976	383.7822	533.8123	654.9619
17463.0000	7399.0156	11210.8281	15022.6523	23483.3242	-5360.5039	-9242.3945	-5763.5391	-2284.6758	-5442.1758
-86.8166	8605.8320	10911.3633	16031.5781	18946.8359	77.1659	972.8484	114.6435	-390.3855	-966.9385
20432.8516	9427.8906	12894.9023	16361.9219	28374.7461	-1456.8647	-1366.9316	-1867.9832	-2369.0356	-5213.1719
-74.4962	7384.5547	9075.5547	13182.8437	15456.9023	976.5139	8426.4687	10590.0742	15007.1523	19838.3047
17029.3477	8191.4414	10711.9727	13232.5078	24147.4258	19763.2539	13461.6523	7694.6758	1927.6836	2184.7917
-64.4670	6390.3945	7767.2109	11235.3320	13134.7344	1221.3623	10539.2969	12247.2031	16876.1211	21883.5781

Figure C-1-Continued.

23500.6719	17713.7109	10104.1484	2494.5703	3743.9387
1042.7183	8997.7539	10126.5352	13782.9062	17716.4687
19798.9219	15643.5781	8920.6953	2197.7969	3359.1436
900.7168	7772.4062	8648.2578	11717.6680	15012.6719
17039.3477	13697.6602	7809.9180	1922.1602	3033.0046
422.2009	3643.2285	3548.4905	4533.8437	5554.4062
3179.1418	-197.7344	-317.5271	-437.3203	-1093.8992
256.6128	2214.3462	2379.2583	3177.8020	4028.8015
2992.7026	1013.7305	-447.0730	-1907.8789	-3107.3167
47.1511	406.8733	437.1750	583.9031	740.2695
-4935.7617	-9056.7461	-5709.4453	-2362.1445	-5201.5000
108.6194	937.2910	114.2496	-348.8938	-914.4885
-1328.9854	-1324.7759	-1873.2036	-2421.6326	-5161.2617
1227.8171	9219.8242	10701.8828	15046.3984	20691.7734
20759.1992	16239.8984	10835.6953	5431.4805	3385.9500
1531.3108	11498.7930	12340.5547	16850.7500	22703.7812
24469.3828	20828.4961	13774.9531	6721.3945	4866.5117
1305.6682	9804.4180	10192.2969	13740.3125	18341.6836
20536.5039	18193.8047	11994.6055	5795.3906	4432.1328
1127.3394	8465.3242	8700.8828	11674.6797	15530.3750
17643.4961	15858.3047	10441.7969	5025.2812	3947.6394
468.6687	3519.2900	3378.8330	4400.0508	5721.6992
3629.0071	734.4883	857.5115	980.5352	-512.6248
303.2297	2276.9888	2341.1472	3141.7542	4179.7930
3191.0781	1497.2969	144.8682	-1207.5625	-2701.8555
62.7617	471.2852	484.5642	650.2720	865.1228
-4491.5430	-8855.8047	-5622.8906	-2389.9687	-5013.8125
122.9185	923.0098	120.2117	-303.0078	-860.1687
-1195.8738	-1267.3516	-1956.2852	-2645.2202	-5134.6211
1600.7266	9487.1562	10932.7500	15021.8867	21597.5039
22827.0391	19524.9258	15909.8711	12294.8164	6858.6484
1990.1897	11795.4180	12544.0078	16733.3086	23567.1172
26503.0977	24177.6562	18885.9102	13594.1562	9403.0039
1694.5745	10043.3711	10339.5742	13615.5273	18997.7617
22076.3555	20772.3320	15936.4453	11100.5469	8527.9453
1462.3940	8667.2891	8820.1602	11559.5898	16072.9336
18907.8984	17989.2461	13708.7305	9428.2070	7552.4180
621.8806	3685.7502	3572.4824	4585.3242	6276.5391
4312.7109	1492.7187	2223.3118	2953.9062	799.6365
390.9087	2316.8313	2388.6353	3147.3035	4393.3359
3594.8762	2082.7578	913.3369	-256.0859	-2043.8499
96.3375	570.9714	588.6672	775.6372	1082.7161
-4186.6172	-8624.8242	-5442.1680	-2259.5078	-5000.0234
157.8875	935.7646	150.3719	-238.0189	-776.6433
-1094.9541	-1195.8940	-1902.6548	-2609.4170	-5273.9922
1759.7410	9679.8164	11037.9492	15340.9297	22647.9687
25026.1914	23904.3047	22882.6680	21861.0312	12335.6094
2180.4753	11994.1523	12593.5586	16989.9883	24572.9609
28350.9141	28163.7695	25016.7109	21869.6523	16128.7461
1853.7957	10197.1836	10356.8789	13792.5625	19764.3477
23326.7148	23626.6602	20348.3984	17070.1328	14339.9570
1598.9285	8795.2344	8827.5977	11699.9570	16707.6406
19882.6992	20277.0078	17268.5547	14260.1016	12586.2500
752.3494	4138.4531	3795.3613	4837.5547	6707.3164
4890.5312	2389.7734	3707.7725	5025.7734	2460.1204
432.1914	2377.3579	2430.9119	3245.9934	4660.4102
3915.7312	2623.4062	1701.2585	779.1094	-1357.4570
124.7645	686.2930	701.7529	937.0498	1345.3623
-3778.9001	-8374.6523	-5219.9922	-2065.3242	-5071.7773
171.5049	943.3979	180.1627	-173.6460	-677.5415

-982.1262	-1149.3533	-1935.0591	-2720.7664	-5506.5898
2319.1860	9927.3359	11162.4141	15733.8555	24049.0820
28181.9883	30209.9492	29785.0664	29360.1836	18942.9609
2863.1494	12255.7852	12658.1445	17319.0000	25940.6406
30641.2383	33053.2031	31144.4609	29235.7187	23178.8828
2430.2351	10402.6836	10384.4883	14025.6328	20816.8086
24723.4414	26783.4492	24783.6367	22783.8281	19944.0820
2094.8862	8967.2148	8843.1719	11886.9844	17582.3398
20918.9453	22693.0937	20856.4609	19019.8320	17275.2734
902.0552	3861.2705	3677.0774	4873.2266	7134.0937
5446.2812	3351.6797	5212.5898	7073.5039	3969.3081
592.8267	2537.6106	2504.8418	3368.2463	4983.3789
4246.1523	3191.7773	2453.0515	1714.3242	-714.6602
189.0630	809.2891	798.8386	1074.1938	1589.2883
-3380.0352	-8096.8984	-4944.6484	-1792.3906	-5170.3242
215.6990	923.3049	187.9067	-131.4474	-603.4136
-875.5437	-1082.2783	-1904.1321	-2725.9873	-5676.6484
2226.2576	10386.4922	11154.8398	16529.1719	25643.3633
31925.8906	36888.8086	36850.0586	36811.3125	28777.2734
2737.5930	12772.1016	12576.2578	18085.5430	27494.8672
33402.2734	37929.0469	37208.1797	36487.3125	31638.8672
2319.6118	10822.0312	10293.4141	14611.9648	22012.9023
26500.7266	29893.1836	29142.3867	28391.5898	25843.8750
1998.2710	9322.8320	8758.1367	12373.0625	18576.4062
22285.6094	25073.6758	24379.0781	23684.4805	21940.5508
856.6401	3996.6118	3679.2014	5156.2812	7696.8437
6085.3047	4222.2422	6610.4297	8998.6211	5435.5273
557.4377	2600.6980	2490.7500	3545.0283	5350.5234
4651.7148	3760.6450	3177.5144	2594.3828	-78.6045
192.6126	898.6245	860.6338	1224.9219	1848.7776
-3046.9189	-7816.6758	-4673.6328	-1530.5859	-5246.6602
197.4803	921.3342	193.1936	-97.5948	-544.4731
-786.6392	-996.2913	-1909.4268	-2822.5637	-5791.8359
2758.2349	10674.5664	11623.4531	17012.7070	27325.4102
33877.5977	40553.0352	42202.7305	43852.4336	41506.2422
3377.4368	13070.9219	13018.9414	18494.9727	29119.6602
35227.2422	41462.9922	42366.9727	43270.9570	40596.2930
2856.4395	11054.6250	10627.8437	14904.9727	23258.9961
27884.8477	32612.1523	33116.3555	33620.5625	31454.8672
2459.0823	9516.8242	9033.9375	12609.2383	19610.5820
23428.5742	27331.8125	27679.2969	28026.7891	26184.2773
1163.6987	4503.5977	4006.9595	5450.8125	8321.5703
6656.0977	5014.8477	7866.4531	10718.0664	6627.1367
694.3101	2687.0295	2604.1953	3663.1655	5728.2578
5029.9961	4350.0430	3871.4478	3392.8516	350.4741
254.6311	985.4404	955.0618	1343.4292	2100.7800
-2722.9814	-7556.6484	-4391.7148	-1226.7734	-5312.7500
238.8811	924.4871	209.1973	-61.8667	-484.6914
-709.7490	-937.3892	-1866.8506	-2796.3135	-5878.5156
3094.4099	10889.9258	12070.2383	18052.0508	29469.0703
36097.2812	44253.0781	47205.8477	50158.6289	47026.2227
3772.0593	13274.7266	13420.2852	19489.9766	31209.4648
37311.5273	44992.5586	47134.6250	49276.6953	45817.7773
3183.8972	11204.8516	10923.3008	15664.4023	24869.2461
29469.6719	35317.2148	36775.1992	38233.1914	35459.3906
2739.0417	9639.3047	9274.9531	13238.2109	20949.3828
24738.4844	29574.4844	30712.1172	31849.7539	29498.6914
1261.4626	4439.3711	4058.8784	5683.1641	8873.0859
7289.9687	6015.3633	9042.8867	12070.4219	7523.7031
783.0369	2755.6836	2676.2832	3832.6985	6079.2461

Figure C-1-Continued.

5369.4570	4886.9023	4433.1484	3979.3945	759.3525	30510.0391	38269.1602	40289.6836	42310.2148	36971.6211
301.1216	1059.7151	1029.1816	1473.8879	2337.8123	1392.2935	4697.3086	4562.0664	6784.1523	10925.8789
-2437.6709	-7316.3164	-4162.8789	-1009.4336	-5347.9102	9201.5625	8475.6602	11722.9258	14970.2031	9367.0039
257.1685	905.0339	213.1723	-36.1893	-429.8237	998.5854	3369.0203	3163.5415	4649.1992	7427.5625
-632.8369	-862.6311	-1816.3474	-2770.0652	-5907.7187	6512.5586	6304.2070	5638.2969	4972.3906	1265.8262
3244.5085	11183.6758	12740.6836	19116.3516	31644.9375	403.5090	1361.3557	1278.3259	1878.6531	3001.3342
38646.1914	48356.2812	51913.0937	55469.9180	51556.7422	-1803.8572	-6804.7734	-3742.4280	-680.0742	-5588.9297
3936.2026	13567.9141	14064.6562	20499.1797	33303.9531	234.5578	791.3491	179.6503	-32.6926	-378.2461
39705.5469	48890.2383	51577.6406	54265.0469	50048.8008	-568.1895	-819.7844	-1928.2878	-3036.7932	-6078.6133
3315.5349	11428.5000	11415.2734	16432.0234	26475.2422	3800.5205	12793.1133	15110.3633	23825.1602	40271.7227
31291.4570	38300.9961	40174.6445	42048.2969	38693.1953	48273.9766	62075.9805	66405.3125	70734.6875	61368.7383
2850.1479	9824.3320	9682.4180	13873.0586	22282.0000	4512.4141	15189.4531	16230.2734	24881.4883	41325.5820
26244.5352	32046.6445	33525.2617	35003.8867	32168.4336	48467.4570	61432.3242	64819.9687	68207.6250	58890.3437
1165.2559	4016.5850	4031.4482	5812.8242	9376.1094	3765.7197	12675.9687	13033.1133	19745.6484	32546.7656
7778.9141	6726.9648	9902.3789	13077.8047	8278.6328	37886.0117	47776.9766	50208.2852	52639.6016	45404.0703
835.4011	2879.5906	2818.4009	4028.4126	6459.4414	3226.3328	10860.3125	11009.9062	16605.8945	27291.5273
5711.0078	5362.8789	4867.2656	4371.6562	1020.1018	31666.5547	39846.0859	41777.1328	43708.1875	37660.1133
331.4636	1142.5410	1118.2637	1598.3621	2562.9263	1433.1177	4824.0859	4703.3828	7003.5234	11412.6836
-2186.0461	-7088.2461	-3990.9868	-893.7187	-5387.5547	9550.3945	8835.5234	12008.3672	15181.2187	9452.2070
255.7452	881.5422	210.8664	-27.6452	-404.8501	1015.5129	3418.3667	3220.8491	4739.6953	7662.1797
-581.5161	-798.9431	-1844.8813	-2890.8215	-5931.1602	6637.3945	6410.0469	5695.0547	4980.0664	1208.5803
3144.8396	11395.1602	13391.3398	20040.0234	33855.1406	408.6189	1375.4722	1295.9958	1907.1460	3083.0869
41232.5078	52228.7812	56180.3203	60131.8672	55244.9258	-1762.0381	-6818.8594	-3782.1096	-745.3516	-5655.5625
3796.1389	13755.1094	14673.6680	21341.2266	35405.3437	230.2390	775.0183	172.7807	-35.5968	-377.8225
42111.7695	52514.2734	55551.8164	58589.3672	53447.3672	-595.7185	-885.1858	-2001.4216	-3117.6594	-6133.7187
3190.5725	11560.8711	11874.6797	17061.2578	28079.0898	3980.6423	13248.8945	15946.8086	24880.8047	42123.0586
33116.6484	41060.8008	43202.5586	45344.3242	41282.4883	49856.6758	64778.1055	68412.5000	72046.9375	61871.6602
2740.5706	9930.3125	10060.9961	14389.5742	23610.1641	4698.3125	15637.5391	17018.9648	25820.1367	42957.9570
27751.0312	34327.5625	36024.8984	37722.2422	34299.9102	49785.7422	63791.1055	66536.5625	69282.1250	59262.1016
1279.2751	4635.3867	4397.9961	6146.7539	9928.1016	3910.9543	13016.9492	13632.8867	20442.7305	33756.9023
8283.0859	7365.0625	10645.3281	13925.6016	8785.8867	38844.5039	49532.2969	51484.3164	53436.3398	45680.6836
841.1118	3047.7246	2962.0635	4176.0000	6785.5703	3347.7190	11142.3164	11505.5703	17176.1133	28280.6133
6002.1289	5745.4844	5223.3516	4701.2227	1164.7690	32440.8477	41278.0625	42811.0898	44344.1250	37870.3828
341.8945	1238.8372	1204.0183	1697.4585	2758.1951	1625.3396	5409.6680	5040.3320	7265.6953	11684.4922
-2006.4487	-6947.1953	-3858.4087	-769.6133	-5451.1367	9660.6602	9029.6016	12093.2695	15156.9492	9379.3203
235.0110	851.5500	207.2840	-18.5502	-376.1777	1026.1931	3415.5105	3298.3459	4815.5742	7812.2461
-569.8965	-813.6345	-1888.4492	-2963.2656	-5975.6328	6656.7344	6460.9219	5660.0156	4859.1133	1065.5786
3279.5920	11824.5078	13851.5273	21392.7461	35953.7969	410.5349	1366.3967	1319.5251	1926.5032	3125.3411
43731.9453	55748.5625	60138.7656	64528.9766	58015.1094	-1760.4854	-6900.1172	-3849.1877	-798.2500	-5768.2422
3937.9570	14198.2305	15076.4687	22632.8086	37362.5977	233.1066	775.8557	169.7917	-45.9308	-397.8865
44404.2031	55749.4297	59193.2344	62637.0508	55954.4414	-630.6025	-954.2324	-2063.2036	-3172.1765	-6203.3594
3302.2205	11906.0937	12168.7266	18048.7070	29561.6523	3996.4265	13367.2344	16644.9922	26481.7148	43876.6016
34846.6797	43509.0195	45966.6445	48424.2734	43185.2812	52021.7109	66862.5625	69683.5000	72504.5625	61657.7461
2834.1450	10218.4570	10299.9141	15207.7539	24833.9336	4688.1445	15680.8984	17638.5039	27301.2422	44474.4492
29175.4727	36344.6758	38301.3828	40258.0977	35859.5898	51679.3750	65535.9805	67548.1875	69560.4375	58977.2383
1451.2007	5232.2773	4657.2187	6576.0508	10413.0859	3892.3877	13019.2461	14090.8594	21562.9531	34872.9375
8804.5547	8049.3594	11309.9023	14570.4570	9098.6094	40251.9961	50811.9062	52220.3633	53628.8281	45461.4531
893.7520	3222.4065	3055.3745	4417.4023	7111.8281	3328.7173	11133.8828	11879.4180	18099.5508	29189.4023
6275.1406	6046.6445	5488.6328	4930.6250	1250.6584	33589.3359	42312.5781	43396.0625	44479.5508	37670.9336
364.1409	1312.9033	1244.8496	1799.7815	2897.5686	1537.3960	5142.2773	5041.1758	7471.1367	11830.2422
-1889.5183	-6859.7344	-3755.3716	-651.0000	-5519.3906	9799.4492	9029.9570	12037.2305	15044.5156	9232.0703
222.9325	803.7788	187.3687	-26.5983	-372.0950	1018.9771	3408.2715	3387.9136	5044.8633	8013.9453
-570.8149	-824.8582	-1854.1697	-2883.4832	-6041.3281	6790.9648	6442.0547	5542.0117	4641.9727	858.6218
3654.9065	12330.8945	14473.9687	22795.8398	38093.8125	393.8064	1317.2031	1309.3364	1949.7017	3097.1714
46127.4180	59166.0547	63664.2109	68162.3750	60048.9258	-1823.3792	-6978.6211	-3962.0491	-945.4687	-5856.0547
4364.4844	14724.8750	15651.0273	23961.7187	39336.7617	239.8215	802.1543	169.2617	-65.2360	-442.1208
46568.9883	58854.1641	62394.0781	65934.0000	57757.9102	-676.8760	-998.7524	-2146.3594	-3293.9680	-6269.9883
3651.2178	12318.4492	12600.4336	19061.9922	31051.3086	4131.4609	13598.8789	17031.9531	27311.3047	45200.1641
36471.8867	45849.8320	48387.4180	50925.0117	44549.9609	53028.1094	67852.8750	69842.1875	71831.6250	61008.8164
3131.0015	10563.3477	10654.9883	16046.3164	26061.3984	4816.1836	15852.6758	17932.6172	27983.0391	45544.1484

Figure C-1-Continued.

52420.8242	66214.1875	67501.4375	68788.7500	58310.2812
3988.1274	13127.0859	14291.0156	22051.9961	35637.2500
40763.7305	51268.8008	52146.1680	53023.5430	44958.8906
3407.3394	11215.3984	12036.4766	18492.9453	29802.8477
33989.9883	42661.9609	43308.5625	43955.1680	37238.5508
1550.7007	5104.1953	5101.7969	7662.0508	12165.0469
9942.5234	9031.8750	11879.2656	14726.6641	9016.8594
1063.5474	3500.7104	3423.6282	5103.7266	8062.8789
6752.4687	6333.0195	5362.4531	4391.8867	702.1206
400.0725	1316.8560	1287.8604	1919.8613	3033.0007
-1891.9919	-7066.6250	-4082.6780	-1098.7227	-5929.1367
241.7566	795.7517	156.4185	-86.8700	-479.3723
-712.9111	-1040.5154	-2162.5129	-3284.5122	-6320.7656
4364.9687	14046.9766	17332.3750	28288.4766	46132.5625
53854.5703	68232.8750	69324.3125	70415.8125	59635.7148
5055.8047	16270.1758	18146.7383	28820.0977	46215.8398
52989.9219	66313.4375	66829.3125	67345.3125	56988.0234
4175.3047	13436.6250	14431.5234	22665.9062	36090.6953
41144.8008	51284.3086	51598.5664	51912.8320	43962.5586
3563.8027	11468.7305	12144.4961	18991.5625	30155.9531
34281.9023	42645.0156	42829.6445	43014.2812	36399.3672
1762.3811	5671.5469	5282.6953	7912.7266	12207.0469
9890.1797	8795.7227	11556.8359	14313.9609	8728.2539
1133.0962	3646.4351	3455.5332	5208.2695	8069.5156
6749.2070	6263.0859	5180.9062	4098.7266	434.5750
417.1777	1342.5266	1272.2419	1917.5574	2970.9966
-1991.1519	-7199.4023	-4235.3281	-1271.2461	-6005.0781
247.5174	796.5398	147.0617	-105.5515	-511.7136
-757.7983	-1097.5452	-2217.8184	-3338.0935	-6396.3086
4286.5391	13188.7305	16827.7891	28493.5859	46600.9492
54283.9531	67195.8750	66800.8750	66405.8750	56363.7930
5369.0391	16519.3398	17946.0625	29128.9844	46425.5352
53182.6445	65062.5820	64263.6445	63464.7070	53888.4297
4606.3125	14172.6094	14441.1602	22989.1523	36185.8320
41239.2109	50264.9687	49600.3203	48935.6719	41605.5937
3986.3845	12265.2187	12207.6992	19287.8008	30209.9766
34336.0156	41769.4805	41149.8867	40530.2930	34436.3125
1830.4661	5631.9375	5118.6992	7836.6523	12014.9180
9689.4062	8297.2305	10859.5117	13421.7969	8092.4687
1220.9697	3756.6528	3405.2864	5208.3477	7979.8477
6627.2266	5912.9805	4734.8906	3556.8008	45.9226
431.7048	1328.2600	1204.0256	1841.5454	2821.4795
-2183.1477	-7398.0703	-4440.6914	-1483.3086	-6087.0273
252.0819	775.6001	125.6938	-134.2727	-554.7021
-810.9512	-1145.3154	-2293.6609	-3442.0083	-6428.7148

Figure C-1-Concluded.

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15  15  73   1
     .1053        .1785        .2290        .3010        .3830
     .4430        .4940        .5465        .5955        .6445
     .7060        .7985        .8830        .9410        .9850
     .0020        .0100        .0260        .0500        .0820
     .1450        .2350        .3250        .4150        .5050
     .5950        .6850        .7750        .8650        .9550
  -10.7200    1417.0000    3474.0000    6806.0000   11570.0000
16920.0000   22230.0000   27140.0000   30760.0000   34560.0000
39420.0000   46170.0000   48890.0000   44910.0000   33180.0000
  -11.1000    1491.0000    3648.0000    7126.0000   12070.0000
17560.0000   22950.0000   27970.0000   31820.0000   35900.0000
41260.0000   49150.0000   53520.0000   50790.0000   39010.0000
   -9.0310    1236.0000    3018.0000    5885.0000    9953.0000
14420.0000   18770.0000   22850.0000   26050.0000   29470.0000
34020.0000   40960.0000   45430.0000   44070.0000   34780.0000
   -6.8250     968.9000    2364.0000    4607.0000    7786.0000
11260.0000   14640.0000   17820.0000   20330.0000   23020.0000
26620.0000   32170.0000   35920.0000   35150.0000   28080.0000
   -5.2830     772.0000    1883.0000    3668.0000    6196.0000
 8956.0000   11640.0000   14160.0000   16150.0000   18300.0000
21170.0000   25620.0000   28690.0000   28190.0000   22650.0000
   -3.3610     560.7000    1366.0000    2659.0000    4488.0000
 6480.0000    8412.0000   10230.0000   11670.0000   13210.0000
15270.0000   18470.0000   20690.0000   20360.0000   16420.0000
   -1.8860     399.0000     970.4000    1887.0000    3182.0000
 4587.0000    5947.0000    7222.0000    8230.0000    9310.0000
10750.0000   12960.0000   14480.0000   14230.0000   11490.0000
    -.6189     308.8000     749.0000    1455.0000    2451.0000
 3531.0000    4573.0000    5550.0000    6321.0000    7146.0000
 8243.0000    9925.0000   11070.0000   10880.0000    8804.0000
    -.1578     248.6000     601.9000    1169.0000    1968.0000
 2832.0000    3667.0000    4447.0000    5064.0000    5722.0000
 6596.0000    7933.0000    8835.0000    8679.0000    7033.0000
     .5992     203.2000     490.2000     950.8000    1600.0000
 2301.0000    2977.0000    3610.0000    4111.0000    4644.0000
 5352.0000    6433.0000    7163.0000    7042.0000    5732.0000
    1.0570     165.0000     396.7000     768.6000    1293.0000
 1858.0000    2402.0000    2911.0000    3314.0000    3744.0000
 4312.0000    5179.0000    5764.0000    5670.0000    4634.0000
    1.6840     132.4000     316.2000     611.9000    1028.0000
 1476.0000    1907.0000    2311.0000    2631.0000    2972.0000
 3423.0000    4111.0000    4576.0000    4513.0000    3717.0000
    2.4470     103.6000     244.9000     472.7000     793.9000
 1137.0000    1468.0000    1778.0000    2026.0000    2290.0000
 2640.0000    3174.0000    3542.0000    3510.0000    2934.0000
    1.7450      70.5300     166.5000     321.0000     538.7000
  770.9000     994.0000    1203.0000    1370.0000    1547.0000
 1780.0000    2134.0000    2374.0000    2347.0000    1960.0000
    9.0290      63.4800     132.6000     249.4000     417.6000
  588.4000     753.7000     920.3000    1068.0000    1228.0000
 1446.0000    1801.0000    2116.0000    2255.0000    2186.0000
  -12.0700    1834.0000    4053.0000    7574.0000   12630.0000
17550.0000   22150.0000   26530.0000   30060.0000   33770.0000
38270.0000   43760.0000   45140.0000   42060.0000   30710.0000
  -12.4400    1931.0000    4256.0000    7932.0000   13190.0000
18250.0000   22990.0000   27550.0000   31340.0000   35370.0000
40440.0000   47180.0000   50190.0000   48230.0000   36530.0000
  -10.0600    1601.0000    3522.0000    6552.0000   10870.0000
15010.0000   18870.0000   22620.0000   25790.0000   29200.0000
33560.0000   39660.0000   43050.0000   42240.0000   32850.0000
   -7.5140    1255.0000    2759.0000    5130.0000    8505.0000
11730.0000   14740.0000   17680.0000   20170.0000   22860.0000
26320.0000   31250.0000   34190.0000   33820.0000   26620.0000
   -5.7580     999.7000    2197.0000    4084.0000    6769.0000
 9334.0000   11720.0000   14050.0000   16040.0000   18190.0000
20960.0000   24930.0000   27360.0000   27170.0000   21500.0000
   -3.4790     726.0000    1594.0000    2961.0000    4902.0000
 6755.0000    8477.0000   10160.0000   11590.0000   13140.0000
15130.0000   17990.0000   19760.0000   19650.0000   15610.0000
   -1.7290     516.4000    1132.0000    2101.0000    3474.0000
 4781.0000    5993.0000    7174.0000    8178.0000    9258.0000
10650.0000   12620.0000   13830.0000   13730.0000   10920.0000
    -.0959     399.7000     874.1000    1620.0000    2677.0000
 3680.0000    4610.0000    5514.0000    6283.0000    7108.0000
 8166.0000    9668.0000   10570.0000   10500.0000    8374.0000
     .4255     321.6000     702.4000    1301.0000    2148.0000
 2952.0000    3696.0000    4420.0000    5033.0000    5692.0000
 6535.0000    7728.0000    8442.0000    8376.0000    6692.0000
    1.4230     262.8000     572.1000    1059.0000    1747.0000
 2399.0000    3003.0000    3589.0000    4087.0000    4622.0000
 5304.0000    6270.0000    6849.0000    6802.0000    5463.0000
    1.9970     213.3000     463.0000     856.0000    1412.0000
 1937.0000    2423.0000    2896.0000    3297.0000    3727.0000
 4275.0000    5051.0000    5515.0000    5480.0000    4422.0000
    2.8370     171.0000     369.2000     681.6000    1123.0000
 1540.0000    1925.0000    2300.0000    2619.0000    2961.0000
 3397.0000    4013.0000    4386.0000    4368.0000    3558.0000
    3.8880     133.7000     286.1000     526.8000     867.2000
 1188.0000    1484.0000    1774.0000    2021.0000    2286.0000
 2624.0000    3105.0000    3405.0000    3409.0000    2823.0000
    2.7630      91.0200     194.5000     357.8000     588.4000
  805.1000    1005.0000    1200.0000    1366.0000    1543.0000
 1769.0000    2087.0000    2281.0000    2278.0000    1884.0000
   13.5000      81.0700     156.2000     280.6000     459.2000
  624.8000     780.6000     942.5000    1092.0000    1256.0000
 1474.0000    1818.0000    2117.0000    2275.0000    2207.0000
  -39.0200    2186.0000    4503.0000    8217.0000   13390.0000
17620.0000   21320.0000   25030.0000   28580.0000   32200.0000
36090.0000   40150.0000   40360.0000   37710.0000   27070.0000
  -40.7100    2302.0000    4733.0000    8613.0000   14000.0000
18410.0000   22300.0000   26250.0000   30090.0000   34070.0000
38580.0000   43920.0000   45620.0000   43900.0000   32660.0000
  -33.4000    1909.0000    3918.0000    7119.0000   11550.0000
15190.0000   18400.0000   21700.0000   24930.0000   28320.0000
32270.0000   37300.0000   39590.0000   38870.0000   29650.0000
  -25.6500    1497.0000    3070.0000    5575.0000    9040.0000
11880.0000   14400.0000   16990.0000   19540.0000   22230.0000
25390.0000   29510.0000   31590.0000   31270.0000   24130.0000
  -20.1200    1193.0000    2445.0000    4439.0000    7195.0000
 9458.0000   11460.0000   13530.0000   15560.0000   17710.0000
20240.0000   23590.0000   25340.0000   25180.0000   19540.0000
  -13.6100     866.1000    1774.0000    3218.0000    5212.0000
 6847.0000    8294.0000    9783.0000   11250.0000   12800.0000
14630.0000   17040.0000   18320.0000   18230.0000   14200.0000
   -8.6220     616.1000    1260.0000    2283.0000    3693.0000
 4846.0000    5865.0000    6911.0000    7940.0000    9020.0000
10290.0000   11960.0000   12830.0000   12740.0000    9938.0000
   -4.9060     476.9000     973.0000    1761.0000    2845.0000
 3731.0000    4513.0000    5315.0000    6103.0000    6928.0000
```

Figure C-2. - CH-53A Predicted data base (Flexible Blade, Variable Inflow Model) - 48.9 m/sec (95 kt).

7899.0000	9166.0000	9819.0000	9752.0000	7637.0000
-3.2330	383.8000	782.0000	1414.0000	2284.0000
2994.0000	3620.0000	4261.0000	4890.0000	5549.0000
6322.0000	7328.0000	7842.0000	7785.0000	6107.0000
-1.1120	313.7000	637.3000	1151.0000	1858.0000
2434.0000	2943.0000	3463.0000	3974.0000	4508.0000
5135.0000	5951.0000	6372.0000	6332.0000	4999.0000
.2954	254.7000	515.9000	931.0000	1501.0000
1966.0000	2376.0000	2796.0000	3207.0000	3637.0000
4141.0000	4798.0000	5137.0000	5109.0000	4057.0000
1.9940	204.3000	411.8000	741.7000	1195.0000
1564.0000	1890.0000	2224.0000	2552.0000	2893.0000
3295.0000	3819.0000	4096.0000	4084.0000	3280.0000
3.9340	159.9000	319.5000	573.9000	923.5000
1209.0000	1461.0000	1720.0000	1974.0000	2239.0000
2552.0000	2965.0000	3195.0000	3204.0000	2624.0000
2.8440	108.8000	217.2000	389.8000	626.5000
819.3000	989.2000	1163.0000	1334.0000	1511.0000
1720.0000	1992.0000	2139.0000	2140.0000	1751.0000
18.2300	98.0300	177.8000	310.1000	495.7000
651.7000	794.6000	948.7000	1104.0000	1270.0000
1483.0000	1811.0000	2093.0000	2260.0000	2202.0000
-28.3100	2487.0000	4848.0000	8532.0000	13530.0000
17070.0000	20080.0000	23240.0000	26630.0000	30010.0000
33240.0000	36020.0000	35100.0000	32420.0000	22810.0000
-29.3300	2621.0000	5101.0000	8962.0000	14190.0000
17940.0000	21170.0000	24610.0000	28320.0000	32100.0000
35980.0000	40010.0000	40350.0000	38380.0000	27900.0000
-23.8700	2174.0000	4227.0000	7418.0000	11740.0000
14860.0000	17570.0000	20480.0000	23630.0000	26890.0000
30360.0000	34330.0000	35430.0000	34380.0000	25570.0000
-18.0200	1705.0000	3313.0000	5812.0000	9196.0000
11640.0000	13780.0000	16080.0000	18580.0000	21160.0000
23960.0000	27280.0000	28410.0000	27810.0000	20910.0000
-13.9400	1359.0000	2639.0000	4629.0000	7322.0000
9274.0000	10980.0000	12820.0000	14810.0000	16880.0000
19140.0000	21850.0000	22850.0000	22450.0000	16970.0000
-8.8240	986.8000	1915.0000	3356.0000	5305.0000
*6717.0000	7948.0000	9279.0000	10720.0000	12210.0000
13840.0000	15810.0000	16550.0000	16280.0000	12360.0000
-4.8980	702.1000	1360.0000	2382.0000	3759.0000
4755.0000	5622.0000	6557.0000	7566.0000	8610.0000
9744.0000	11100.0000	11590.0000	11390.0000	8657.0000
-1.4930	543.6000	1051.0000	1837.0000	2898.0000
3663.0000	4329.0000	5046.0000	5819.0000	6617.0000
7482.0000	8512.0000	8884.0000	8728.0000	6674.0000
-.2722	437.5000	844.7000	1476.0000	2326.0000
2940.0000	3473.0000	4047.0000	4664.0000	5301.0000
5990.0000	6808.0000	7100.0000	6972.0000	5345.0000
1.7660	357.8000	688.8000	1202.0000	1893.0000
2392.0000	2826.0000	3293.0000	3794.0000	4311.0000
4870.0000	5536.0000	5780.0000	5685.0000	4395.0000
2.9900	290.7000	557.9000	972.6000	1531.0000
1934.0000	2284.0000	2661.0000	3065.0000	3481.0000
3932.0000	4468.0000	4668.0000	4598.0000	3581.0000
4.6800	233.4000	445.8000	775.7000	1220.0000
1541.0000	1820.0000	2121.0000	2442.0000	2774.0000
3134.0000	3565.0000	3735.0000	3692.0000	2917.0000
6.7450	183.1000	346.6000	601.4000	944.4000
1194.0000	1411.0000	1645.0000	1895.0000	2153.0000

2436.0000	2781.0000	2932.0000	2920.0000	2364.0000
4.8070	124.6000	235.6000	408.4000	640.6000
809.1000	955.6000	1113.0000	1281.0000	1453.0000
1641.0000	1868.0000	1963.0000	1949.0000	1577.0000
24.6700	114.6000	197.8000	333.4000	520.4000
666.7000	800.2000	948.5000	1105.0000	1272.0000
1479.0000	1790.0000	2054.0000	2220.0000	2176.0000
-36.2300	2892.0000	5309.0000	8620.0000	12930.0000
16070.0000	18760.0000	21580.0000	24710.0000	27720.0000
30270.0000	31790.0000	30390.0000	26970.0000	18330.0000
-37.5700	3049.0000	5590.0000	9078.0000	13630.0000
17000.0000	19940.0000	23050.0000	26540.0000	29980.0000
33160.0000	35820.0000	35440.0000	32430.0000	22720.0000
-30.5900	2530.0000	4635.0000	7527.0000	11320.0000
14150.0000	16630.0000	19300.0000	22290.0000	25290.0000
28220.0000	31050.0000	31440.0000	29370.0000	21030.0000
-23.1100	1984.0000	3633.0000	5902.0000	8878.0000
11110.0000	13070.0000	15190.0000	17570.0000	19960.0000
22350.0000	24780.0000	25330.0000	23880.0000	17280.0000
-17.8700	1582.0000	2895.0000	4702.0000	7074.0000
8853.0000	10420.0000	12120.0000	14020.0000	15950.0000
17880.0000	19880.0000	20420.0000	19330.0000	14060.0000
-11.3300	1149.0000	2101.0000	3410.0000	5128.0000
6416.0000	7552.0000	8780.0000	10160.0000	11550.0000
12940.0000	14410.0000	14810.0000	14050.0000	10270.0000
-6.2990	817.3000	1492.0000	2420.0000	3635.0000
4544.0000	5344.0000	6206.0000	7171.0000	8142.0000
9115.0000	10120.0000	10380.0000	9833.0000	7206.0000
-1.9480	632.8000	1153.0000	1868.0000	2804.0000
3503.0000	4118.0000	4780.0000	5519.0000	6262.0000
7005.0000	7770.0000	7971.0000	7558.0000	5585.0000
-.3833	509.4000	927.0000	1501.0000	2252.0000
2812.0000	3305.0000	3835.0000	4425.0000	5018.0000
5610.0000	6218.0000	6375.0000	6045.0000	4483.0000
2.2190	416.6000	756.1000	1224.0000	1835.0000
2291.0000	2692.0000	3124.0000	3604.0000	4085.0000
4567.0000	5065.0000	5202.0000	4949.0000	3713.0000
3.7840	338.5000	612.7000	990.7000	1485.0000
1854.0000	2178.0000	2527.0000	2914.0000	3302.0000
3691.0000	4095.0000	4211.0000	4016.0000	3044.0000
5.9420	271.9000	489.9000	791.3000	1185.0000
1480.0000	1740.0000	2019.0000	2327.0000	2637.0000
2949.0000	3278.0000	3385.0000	3246.0000	2508.0000
8.5760	213.3000	381.4000	615.1000	921.0000
1151.0000	1354.0000	1572.0000	1813.0000	2055.0000
2302.0000	2572.0000	2678.0000	2597.0000	2070.0000
6.1110	145.2000	259.3000	417.7000	624.8000
780.1000	916.7000	1063.0000	1225.0000	1386.0000
1551.0000	1727.0000	1792.0000	1734.0000	1382.0000
31.4100	134.3000	221.2000	352.4000	530.1000
672.6000	803.7000	949.4000	1106.0000	1270.0000
1469.0000	1762.0000	2018.0000	2168.0000	2142.0000
-44.8800	3740.0000	6195.0000	8854.0000	12020.0000
15060.0000	17710.0000	20340.0000	22990.0000	25440.0000
27450.0000	27940.0000	25950.0000	21980.0000	14310.0000
-46.5700	3942.0000	6522.0000	9345.0000	12750.0000
16040.0000	18940.0000	21890.0000	24900.0000	27780.0000
30410.0000	31890.0000	30680.0000	26810.0000	17950.0000
-37.9400	3270.0000	5406.0000	7759.0000	10630.0000
13400.0000	15870.0000	18410.0000	21040.0000	23590.0000

Figure C-2 - Continued.

26070.0000	27890.0000	27480.0000	24520.0000	16760.0000
-28.6700	2564.0000	4238.0000	6087.0000	8349.0000
10540.0000	12500.0000	14520.0000	16620.0000	18670.0000
20710.0000	22340.0000	22240.0000	20040.0000	13840.0000
-22.1800	2043.0000	3376.0000	4851.0000	6658.0000
8404.0000	9972.0000	11600.0000	13280.0000	14930.0000
16590.0000	17960.0000	17960.0000	16260.0000	11290.0000
-14.0600	1484.0000	2450.0000	3519.0000	4830.0000
6095.0000	7230.0000	8406.0000	9624.0000	10820.0000
12030.0000	13030.0000	13050.0000	11850.0000	8272.0000
-7.8330	1055.0000	1740.0000	2498.0000	3425.0000
4318.0000	5118.0000	5944.0000	6797.0000	7636.0000
8471.0000	9158.0000	9155.0000	8303.0000	5824.0000
-2.4460	815.9000	1344.0000	1929.0000	2644.0000
3332.0000	3947.0000	4582.0000	5236.0000	5878.0000
6517.0000	7043.0000	7046.0000	6407.0000	4549.0000
-.5056	656.3000	1080.0000	1550.0000	2125.0000
2676.0000	3169.0000	3677.0000	4200.0000	4712.0000
5222.0000	5640.0000	5640.0000	5134.0000	3666.0000
2.7150	536.1000	880.6000	1264.0000	1734.0000
2183.0000	2584.0000	2999.0000	3424.0000	3842.0000
4258.0000	4605.0000	4618.0000	4225.0000	3066.0000
4.6520	435.0000	713.3000	1024.0000	1405.0000
1768.0000	2093.0000	2428.0000	2772.0000	3109.0000
3446.0000	3730.0000	3750.0000	3445.0000	2537.0000
7.3210	348.6000	570.0000	819.1000	1125.0000
1415.0000	1675.0000	1944.0000	2219.0000	2489.0000
2761.0000	2998.0000	3031.0000	2810.0000	2123.0000
10.5800	272.5000	443.4000	638.0000	877.9000
1105.0000	1309.0000	1520.0000	1736.0000	1948.0000
2166.0000	2369.0000	2422.0000	2281.0000	1795.0000
7.5370	185.3000	301.3000	433.3000	595.6000
749.1000	886.2000	1028.0000	1172.0000	1314.0000
1459.0000	1590.0000	1621.0000	1524.0000	1200.0000
38.7700	164.8000	254.6000	375.1000	533.2000
677.8000	811.8000	957.8000	1109.0000	1266.0000
1459.0000	1736.0000	1983.0000	2121.0000	2115.0000
-54.1000	4891.0000	7586.0000	9559.0000	11500.0000
14390.0000	16900.0000	19230.0000	21430.0000	23310.0000
24870.0000	24580.0000	22200.0000	18090.0000	10800.0000
-56.1800	5149.0000	7973.0000	10100.0000	12260.0000
15400.0000	18180.0000	20820.0000	23390.0000	25680.0000
27820.0000	28360.0000	26560.0000	22330.0000	13730.0000
-45.8000	4268.0000	6601.0000	8389.0000	10240.0000
12910.0000	15290.0000	17590.0000	19870.0000	21940.0000
24020.0000	24990.0000	24000.0000	20600.0000	12940.0000
-34.6200	3345.0000	5173.0000	6583.0000	8055.0000
10170.0000	12060.0000	13900.0000	15730.0000	17410.0000
19140.0000	20080.0000	19500.0000	16910.0000	10740.0000
-26.7900	2665.0000	4120.0000	5247.0000	6426.0000
8114.0000	9628.0000	11110.0000	12580.0000	13940.0000
15350.0000	16170.0000	15780.0000	13750.0000	8785.0000
-16.9900	1934.0000	2988.0000	3806.0000	4664.0000
5888.0000	6985.0000	8058.0000	9125.0000	10110.0000
11140.0000	11750.0000	11490.0000	10040.0000	6467.0000
-9.4710	1374.0000	2121.0000	2701.0000	3309.0000
4173.0000	4945.0000	5700.0000	6447.0000	7138.0000
7849.0000	8265.0000	8065.0000	7050.0000	4576.0000
-2.9760	1062.0000	1637.0000	2086.0000	2557.0000
3222.0000	3817.0000	4397.0000	4970.0000	5501.0000

6046.0000	6368.0000	6224.0000	5466.0000	3617.0000
-.6340	853.5000	1315.0000	1676.0000	2055.0000
2589.0000	3065.0000	3530.0000	3988.0000	4412.0000
4847.0000	5103.0000	4989.0000	4390.0000	2930.0000
3.2470	696.2000	1071.0000	1367.0000	1679.0000
2114.0000	2503.0000	2882.0000	3256.0000	3603.0000
3959.0000	4178.0000	4101.0000	3636.0000	2487.0000
5.5820	564.1000	867.0000	1108.0000	1362.0000
1715.0000	2029.0000	2336.0000	2639.0000	2920.0000
3210.0000	3393.0000	3342.0000	2982.0000	2084.0000
8.7980	450.9000	691.8000	885.9000	1093.0000
1375.0000	1627.0000	1874.0000	2118.0000	2344.0000
2580.0000	2740.0000	2719.0000	2458.0000	1781.0000
12.7200	350.9000	536.7000	690.3000	856.7000
1078.0000	1276.0000	1471.0000	1664.0000	1844.0000
2036.0000	2182.0000	2197.0000	2028.0000	1552.0000
9.0620	238.6000	364.6000	468.7000	581.3000
730.7000	864.0000	994.9000	1124.0000	1244.0000
1371.0000	1465.0000	1471.0000	1355.0000	1039.0000
46.6500	202.5000	299.6000	408.5000	544.3000
689.7000	824.4000	967.9000	1113.0000	1263.0000
1451.0000	1716.0000	1961.0000	2096.0000	2103.0000
-63.7400	5914.0000	8853.0000	10490.0000	11740.0000
14190.0000	16260.0000	18110.0000	19840.0000	21150.0000
22410.0000	21760.0000	19160.0000	15160.0000	8088.0000
-66.2400	6220.0000	9292.0000	11080.0000	12540.0000
15250.0000	17570.0000	19730.0000	21810.0000	23500.0000
25290.0000	25360.0000	23160.0000	18910.0000	10400.0000
-54.0300	5152.0000	7687.0000	9210.0000	10490.0000
12810.0000	14830.0000	16740.0000	18610.0000	20200.0000
21970.0000	22510.0000	21080.0000	17590.0000	9886.0000
-40.8500	4038.0000	6022.0000	7228.0000	8259.0000
10100.0000	11710.0000	13250.0000	14760.0000	16070.0000
17550.0000	18150.0000	17190.0000	14490.0000	8252.0000
-31.6200	3216.0000	4795.0000	5761.0000	6591.0000
8064.0000	9357.0000	10600.0000	11820.0000	12880.0000
14100.0000	14640.0000	13940.0000	11810.0000	6772.0000
-20.0600	2333.0000	3477.0000	4179.0000	4785.0000
5853.0000	6791.0000	7692.0000	8580.0000	9354.0000
10240.0000	10650.0000	10170.0000	8646.0000	5017.0000
-11.1900	1657.0000	2467.0000	2964.0000	3394.0000
4149.0000	4809.0000	5442.0000	6064.0000	6605.0000
7219.0000	7495.0000	7144.0000	6083.0000	3576.0000
-3.5300	1279.0000	1903.0000	2289.0000	2624.0000
3205.0000	3715.0000	4202.0000	4681.0000	5096.0000
5569.0000	5787.0000	5532.0000	4742.0000	2874.0000
-.7666	1028.0000	1528.0000	1839.0000	2109.0000
2576.0000	2984.0000	3375.0000	3758.0000	4090.0000
4468.0000	4642.0000	4440.0000	3818.0000	2345.0000
3.8070	838.1000	1244.0000	1500.0000	1724.0000
2106.0000	2439.0000	2759.0000	3073.0000	3346.0000
3657.0000	3811.0000	3667.0000	3185.0000	2028.0000
6.5600	678.6000	1007.0000	1215.0000	1399.0000
1709.0000	1980.0000	2240.0000	2494.0000	2717.0000
2971.0000	3103.0000	3000.0000	2629.0000	1726.0000
10.3500	541.8000	802.5000	971.3000	1124.0000
1373.0000	1591.0000	1801.0000	2007.0000	2188.0000
2397.0000	2519.0000	2460.0000	2191.0000	1513.0000
14.9600	420.8000	621.7000	756.7000	882.3000
1079.0000	1252.0000	1420.0000	1585.0000	1732.0000

Figure C-2 - Continued.

1904.0000	2023.0000	2012.0000	1839.0000	1364.0000
10.6600	286.0000	422.2000	513.6000	598.6000
731.3000	847.5000	960.2000	1070.0000	1168.0000
1282.0000	1358.0000	1347.0000	1230.0000	915.3000
54.9000	237.4000	341.8000	446.9000	571.9000
711.3000	839.6000	976.5000	1115.0000	1256.0000
1442.0000	1707.0000	1951.0000	2095.0000	2111.0000
-73.4500	5944.0000	8931.0000	10850.0000	12320.0000
14100.0000	15490.0000	16680.0000	18030.0000	18940.0000
19990.0000	19390.0000	16930.0000	13110.0000	6178.0000
-76.4000	6262.0000	9395.0000	11483.0000	13180.0000
15190.0000	16820.0000	18280.0000	19960.0000	21210.0000
22750.0000	22790.0000	20660.0000	16520.0000	8040.0000
-62.3400	5194.0000	7785.0000	9553.0000	11040.0000
12800.0000	14240.0000	15580.0000	17110.0000	18320.0000
19880.0000	20340.0000	18930.0000	15470.0000	7701.0000
-47.1500	4073.0000	6102.0000	7501.0000	8697.0000
10100.0000	11260.0000	12350.0000	13600.0000	14610.0000
15920.0000	16450.0000	15480.0000	12790.0000	6465.0000
-36.4900	3245.0000	4861.0000	5980.0000	6942.0000
8066.0000	9001.0000	9885.0000	10900.0000	11730.0000
12800.0000	13280.0000	12570.0000	10450.0000	5324.0000
-23.1500	2355.0000	3525.0000	4338.0000	5039.0000
5857.0000	6536.0000	7181.0000	7921.0000	8522.0000
9311.0000	9676.0000	9184.0000	7665.0000	3975.0000
-12.9000	1673.0000	2501.0000	3077.0000	3574.0000
4151.0000	4630.0000	5083.0000	5602.0000	6022.0000
6569.0000	6815.0000	6462.0000	5403.0000	2861.0000
-4.0630	1292.0000	1930.0000	2376.0000	2763.0000
3209.0000	3579.0000	3930.0000	4330.0000	4655.0000
5077.0000	5274.0000	5020.0000	4236.0000	2344.0000
-.8742	1039.0000	1551.0000	1909.0000	2221.0000
2579.0000	2877.0000	3158.0000	3479.0000	3739.0000
4077.0000	4235.0000	4036.0000	3418.0000	1930.0000
4.4070	847.7000	1263.0000	1558.0000	1815.0000
2110.0000	2354.0000	2587.0000	2851.0000	3066.0000
3346.0000	3489.0000	3348.0000	2872.0000	1705.0000
7.5830	687.0000	1023.0000	1262.0000	1474.0000
1713.0000	1913.0000	2103.0000	2318.0000	2495.0000
2725.0000	2849.0000	2750.0000	2385.0000	1477.0000
11.9600	549.4000	816.3000	1010.0000	1184.0000
1378.0000	1541.0000	1697.0000	1872.0000	2018.0000
2208.0000	2325.0000	2271.0000	2009.0000	1329.0000
17.2800	428.0000	633.8000	787.7000	929.8000
1086.0000	1217.0000	1345.0000	1488.0000	1609.0000
1768.0000	1885.0000	1879.0000	1713.0000	1239.0000
12.3100	290.9000	430.4000	534.7000	630.7000
735.9000	824.3000	909.8000	1005.0000	1086.0000
1191.0000	1266.0000	1258.0000	1146.0000	832.7000
63.3800	250.2000	358.1000	472.7000	606.8000
734.6000	850.9000	976.4000	1110.0000	1245.0000
1431.0000	1704.0000	1960.0000	2114.0000	2140.0000
-82.7100	4366.0000	7242.0000	9876.0000	12310.0000
13530.0000	14330.0000	15110.0000	16230.0000	16900.0000
17730.0000	17340.0000	15220.0000	11510.0000	5311.0000
-86.1000	4625.0000	7668.0000	10500.0000	13200.0000
14640.0000	15640.0000	16660.0000	18080.0000	19050.0000
20330.0000	20540.0000	18740.0000	14660.0000	6990.0000
-70.2900	3850.0000	6382.0000	8766.0000	11080.0000
12360.0000	13290.0000	14250.0000	15570.0000	16540.0000

17860.0000	18440.0000	17270.0000	13820.0000	6749.0000
-53.1600	3024.0000	5011.0000	6892.0000	8734.0000
9762.0000	10520.0000	11310.0000	12400.0000	13220.0000
14340.0000	14950.0000	14170.0000	11470.0000	5696.0000
-41.1400	2412.0000	3996.0000	5498.0000	6974.0000
7804.0000	8421.0000	9066.0000	9945.0000	10620.0000
11540.0000	12090.0000	11530.0000	9385.0000	4704.0000
-26.0700	1753.0000	2901.0000	3991.0000	5064.0000
5669.0000	6120.0000	6591.0000	7233.0000	7726.0000
8405.0000	8818.0000	8433.0000	6903.0000	3533.0000
-14.5000	1247.0000	2061.0000	2833.0000	3592.0000
4019.0000	4337.0000	4669.0000	5119.0000	5463.0000
5936.0000	6216.0000	5939.0000	4877.0000	2559.0000
-4.4950	967.2000	1594.0000	2190.0000	2778.0000
3109.0000	3357.0000	3616.0000	3964.0000	4232.0000
4598.0000	4823.0000	4629.0000	3845.0000	2126.0000
-.8978	778.9000	1282.0000	1761.0000	2233.0000
2500.0000	2700.0000	2908.0000	3187.0000	3402.0000
3696.0000	3878.0000	3727.0000	3110.0000	1761.0000
5.0790	638.6000	1048.0000	1439.0000	1827.0000
2048.0000	2214.0000	2388.0000	2619.0000	2798.0000
3043.0000	3206.0000	3105.0000	2632.0000	1578.0000
8.6690	519.9000	850.3000	1168.0000	1484.0000
1665.0000	1802.0000	1946.0000	2135.0000	2283.0000
2485.0000	2627.0000	2561.0000	2199.0000	1382.0000
13.6200	419.4000	682.3000	937.6000	1193.0000
1342.0000	1456.0000	1576.0000	1732.0000	1856.0000
2025.0000	2157.0000	2130.0000	1872.0000	1264.0000
19.6500	331.5000	534.6000	735.4000	939.4000
1062.0000	1157.0000	1258.0000	1386.0000	1492.0000
1636.0000	1766.0000	1782.0000	1621.0000	1202.0000
14.0000	225.6000	363.3000	499.3000	637.2000
719.5000	783.5000	851.1000	936.7000	1007.0000
1102.0000	1186.0000	1193.0000	1085.0000	807.9000
71.9300	226.2000	334.9000	468.7000	627.9000
746.2000	852.2000	971.0000	1102.0000	1235.0000
1421.0000	1706.0000	1980.0000	2146.0000	2199.0000
-137.6000	2049.0000	4402.0000	7459.0000	10610.0000
11700.0000	12390.0000	13600.0000	14590.0000	15220.0000
15830.0000	15660.0000	13760.0000	10200.0000	5093.0000
-144.2000	2181.0000	4693.0000	7984.0000	11440.0000
12730.0000	13600.0000	15070.0000	16340.0000	17260.0000
18270.0000	18680.0000	17080.0000	13100.0000	6772.0000
-118.5000	1822.0000	3925.0000	6694.0000	9638.0000
10790.0000	11600.0000	12940.0000	14130.0000	15040.0000
16120.0000	16860.0000	15820.0000	12430.0000	6584.0000
-90.7700	1435.0000	3089.0000	5273.0000	7607.0000
8538.0000	9202.0000	10290.0000	11270.0000	12040.0000
12970.0000	13700.0000	13020.0000	10360.0000	5579.0000
-70.9700	1146.0000	2466.0000	4211.0000	6079.0000
6831.0000	7370.0000	8252.0000	9048.0000	9684.0000
10450.0000	11090.0000	10610.0000	8493.0000	4617.0000
-47.2400	837.1000	1795.0000	3062.0000	4418.0000
4967.0000	5362.0000	6006.0000	6587.0000	7054.0000
7619.0000	8100.0000	7772.0000	6263.0000	3476.0000
-29.0300	599.7000	1280.0000	2177.0000	3137.0000
3526.0000	3805.0000	4258.0000	4666.0000	4992.0000
5386.0000	5716.0000	5481.0000	4435.0000	2522.0000
-14.8600	471.8000	996.4000	1690.0000	2431.0000
2734.0000	2953.0000	3304.0000	3621.0000	3876.0000

Figure C-2- Continued.

4183.0000	4447.0000	4287.0000	3518.0000	2107.0000	1452.0000	1595.0000	1640.0000	1514.0000	1275.0000
-8.8790	382.7000	804.1000	1361.0000	1957.0000	17.0900	52.2000	160.3000	308.9000	467.0000
2201.0000	2377.0000	2660.0000	2914.0000	3119.0000	567.7000	649.7000	723.8000	828.5000	899.2000
3366.0000	3580.0000	3457.0000	2854.0000	1748.0000	978.6000	1072.0000	1099.0000	1013.0000	855.1000
-.6855	319.6000	663.0000	1118.0000	1605.0000	88.3600	154.3000	250.8000	395.9000	571.5000
1808.0000	1956.0000	2190.0000	2401.0000	2573.0000	704.0000	823.6000	950.7000	1097.0000	1236.0000
2782.0000	2971.0000	2894.0000	2433.0000	1575.0000	1422.0000	1728.0000	2034.0000	2230.0000	2361.0000
4.5820	264.7000	542.7000	911.5000	1308.0000	-113.6000	829.4000	3096.0000	4758.0000	5951.0000
1474.0000	1597.0000	1789.0000	1963.0000	2105.0000	8217.0000	10100.0000	11300.0000	12840.0000	13480.0000
2279.0000	2443.0000	2397.0000	2046.0000	1384.0000	13990.0000	13700.0000	12130.0000	9330.0000	5640.0000
11.2100	220.1000	442.2000	737.8000	1057.0000	-118.6000	887.2000	3316.0000	5130.0000	6482.0000
1195.0000	1298.0000	1456.0000	1600.0000	1720.0000	9019.0000	11170.0000	12630.0000	14500.0000	15410.0000
1868.0000	2018.0000	2008.0000	1760.0000	1273.0000	16300.0000	16530.0000	15270.0000	12180.0000	7637.0000
18.9300	182.9000	355.5000	587.1000	839.4000	-97.0300	744.4000	2782.0000	4322.0000	5501.0000
953.7000	1041.0000	1171.0000	1291.0000	1394.0000	7693.0000	9576.0000	10900.0000	12610.0000	13510.0000
1523.0000	1668.0000	1699.0000	1548.0000	1219.0000	14470.0000	15040.0000	14290.0000	11690.0000	7515.0000
13.5900	125.1000	242.2000	399.1000	569.7000	-73.5000	589.2000	2194.0000	3414.0000	4358.0000
646.8000	705.6000	792.8000	872.9000	941.4000	6105.0000	7615.0000	8694.0000	10080.0000	10850.0000
1027.0000	1121.0000	1138.0000	1036.0000	819.1000	11680.0000	12270.0000	11820.0000	9802.0000	6402.0000
79.2600	183.2000	282.9000	430.1000	609.4000	-56.9600	472.5000	1753.0000	2730.0000	3490.0000
727.4000	832.9000	964.4000	1095.0000	1231.0000	4892.0000	6108.0000	6982.0000	8105.0000	8734.0000
1415.0000	1714.0000	2003.0000	2182.0000	2275.0000	9430.0000	9957.0000	9654.0000	8057.0000	5310.0000
-104.2000	382.1000	2512.0000	5345.0000	8176.0000	-36.2700	350.2000	1280.0000	1992.0000	2548.0000
9795.0000	10990.0000	11910.0000	13420.0000	14090.0000	3568.0000	4452.0000	5090.0000	5909.0000	6371.0000
14560.0000	14380.0000	12640.0000	9380.0000	5319.0000	6885.0000	7286.0000	7091.0000	5958.0000	3991.0000
-108.7000	409.8000	2689.0000	5749.0000	8866.0000	-20.3800	256.2000	916.4000	1423.0000	1819.0000
10710.0000	12120.0000	13260.0000	15100.0000	16050.0000	2541.0000	3165.0000	3615.0000	4190.0000	4514.0000
16900.0000	17260.0000	15810.0000	12160.0000	7135.0000	4872.0000	5148.0000	5008.0000	4225.0000	2879.0000
-88.8800	345.0000	2255.0000	4836.0000	7500.0000	-6.7680	210.3000	720.3000	1114.0000	1426.0000
9107.0000	10370.0000	11420.0000	13100.0000	14040.0000	1985.0000	2468.0000	2818.0000	3263.0000	3516.0000
14960.0000	15640.0000	14730.0000	11620.0000	6979.0000	3798.0000	4023.0000	3938.0000	3370.0000	2388.0000
-67.3100	275.0000	1779.0000	3816.0000	5931.0000	-1.8080	174.1000	583.9000	901.8000	1154.0000
7217.0000	8235.0000	9099.0000	10460.0000	11250.0000	1603.0000	1991.0000	2273.0000	2630.0000	2834.0000
12060.0000	12740.0000	12160.0000	9713.0000	5929.0000	3061.0000	3245.0000	3183.0000	2740.0000	1974.0000
-52.1500	221.7000	1422.0000	3051.0000	4744.0000	6.2970	152.7000	487.1000	749.5000	961.3000
5779.0000	6601.0000	7303.0000	8406.0000	9057.0000	1330.0000	1648.0000	1882.0000	2176.0000	2348.0000
9731.0000	10320.0000	9918.0000	7975.0000	4913.0000	2542.0000	2709.0000	2684.0000	2353.0000	1767.0000
-33.1800	168.0000	1040.0000	2223.0000	3455.0000	11.1900	132.2000	403.1000	618.1000	794.0000
4208.0000	4807.0000	5321.0000	6125.0000	6602.0000	1094.0000	1354.0000	1546.0000	1786.0000	1929.0000
7100.0000	7548.0000	7278.0000	5893.0000	3697.0000	2091.0000	2239.0000	2236.0000	1990.0000	1545.0000
-18.6100	126.7000	745.9000	1585.0000	2458.0000	17.8800	118.0000	334.8000	510.4000	657.9000
2991.0000	3415.0000	3777.0000	4342.0000	4676.0000	900.9000	1111.0000	1270.0000	1466.0000	1588.0000
5023.0000	5331.0000	5138.0000	4180.0000	2676.0000	1728.0000	1867.0000	1893.0000	1729.0000	1411.0000
-6.1200	110.2000	588.6000	1238.0000	1913.0000	26.0100	108.6000	277.7000	419.7000	544.0000
2327.0000	2657.0000	2939.0000	3376.0000	3637.0000	737.9000	906.7000	1038.0000	1198.0000	1303.0000
3910.0000	4159.0000	4032.0000	3332.0000	2229.0000	1427.0000	1567.0000	1627.0000	1541.0000	1340.0000
-1.5760	93.5600	478.2000	1000.0000	1543.0000	18.5300	74.9400	189.7000	286.1000	370.5000
1877.0000	2142.0000	2369.0000	2720.0000	2930.0000	501.5000	615.1000	703.4000	810.1000	879.8000
3150.0000	3352.0000	3257.0000	2709.0000	1847.0000	961.9000	1052.0000	1089.0000	1030.0000	896.9000
5.8690	86.9600	400.9000	827.8000	1273.0000	95.9200	174.9000	276.3000	396.1000	535.6000
1548.0000	1768.0000	1958.0000	2247.0000	2423.0000	686.0000	824.2000	960.5000	1111.0000	1251.0000
2610.0000	2792.0000	2739.0000	2323.0000	1660.0000	1442.0000	1755.0000	2075.0000	2294.0000	2449.0000
10.3600	78.8000	333.3000	680.0000	1043.0000	-225.4000	3601.0000	6309.0000	6414.0000	5159.0000
1268.0000	1448.0000	1605.0000	1841.0000	1987.0000	7837.0000	10030.0000	11440.0000	12900.0000	13490.0000
2144.0000	2303.0000	2277.0000	1963.0000	1456.0000	13960.0000	13780.0000	12220.0000	9917.0000	5960.0000
16.5100	75.2400	279.1000	557.7000	851.2000	-237.1000	3838.0000	6734.0000	6909.0000	5632.0000
1035.0000	1183.0000	1315.0000	1507.0000	1631.0000	8620.0000	11110.0000	12810.0000	14610.0000	15480.0000
1766.0000	1913.0000	1920.0000	1702.0000	1335.0000	16320.0000	16700.0000	15480.0000	13040.0000	8137.0000
23.9900	75.1200	234.3000	453.5000	687.2000	-195.7000	3208.0000	5635.0000	5818.0000	4787.0000
836.3000	958.0000	1069.0000	1225.0000	1331.0000	7364.0000	9543.0000	11070.0000	12720.0000	13600.0000

Figure C-2- Continued.

14520.0000	15230.0000	14540.0000	12570.0000	8053.0000	3959.0000	4290.0000	4340.0000	3992.0000	2700.0000
-150.8000	2525.0000	4435.0000	4593.0000	3796.0000	-1.4240	1301.0000	1893.0000	1717.0000	1230.0000
5848.0000	7593.0000	8836.0000	10180.0000	10920.0000	1742.0000	2159.0000	2565.0000	2797.0000	2977.0000
11730.0000	12440.0000	12050.0000	10560.0000	6877.0000	3190.0000	3457.0000	3502.0000	3232.0000	2223.0000
-118.5000	2016.0000	3541.0000	3671.0000	3042.0000	7.6610	1064.0000	1544.0000	1408.0000	1025.0000
4688.0000	6092.0000	7098.0000	8185.0000	8801.0000	1443.0000	1786.0000	2119.0000	2314.0000	2466.0000
9476.0000	10100.0000	9850.0000	8689.0000	5710.0000	2648.0000	2884.0000	2944.0000	2751.0000	1975.0000
-80.4700	1469.0000	2575.0000	2674.0000	2224.0000	13.1200	863.8000	1252.0000	1147.0000	846.3000
3421.0000	4442.0000	5175.0000	5969.0000	6421.0000	1187.0000	1466.0000	1737.0000	1898.0000	2026.0000
6920.0000	7392.0000	7237.0000	6419.0000	4286.0000	2179.0000	2381.0000	2446.0000	2309.0000	1716.0000
-51.2900	1048.0000	1832.0000	1905.0000	1591.0000	20.6300	693.4000	1002.0000	926.8000	701.3000
2438.0000	3158.0000	3675.0000	4232.0000	4549.0000	976.0000	1202.0000	1423.0000	1557.0000	1667.0000
4897.0000	5222.0000	5108.0000	4541.0000	3083.0000	1800.0000	1982.0000	2062.0000	1983.0000	1553.0000
-29.8300	817.9000	1422.0000	1484.0000	1254.0000	29.7800	543.8000	781.8000	735.5000	580.1000
1908.0000	2464.0000	2865.0000	3296.0000	3544.0000	798.2000	978.7000	1157.0000	1271.0000	1367.0000
3818.0000	4081.0000	4016.0000	3611.0000	2545.0000	1488.0000	1660.0000	1762.0000	1741.0000	1460.0000
-20.0100	660.8000	1146.0000	1198.0000	1017.0000	21.2000	369.6000	530.7000	499.5000	395.0000
1542.0000	1989.0000	2311.0000	2657.0000	2857.0000	542.1000	663.5000	783.0000	858.9000	922.9000
3078.0000	3291.0000	3245.0000	2931.0000	2100.0000	1002.0000	1114.0000	1177.0000	1160.0000	974.5000
-7.8420	546.3000	941.3000	989.2000	851.7000	109.0000	344.2000	471.9000	528.5000	572.8000
1282.0000	1648.0000	1914.0000	2200.0000	2368.0000	735.2000	880.3000	1037.0000	1174.0000	1316.0000
2557.0000	2749.0000	2737.0000	2509.0000	1873.0000	1512.0000	1848.0000	2199.0000	2458.0000	2598.0000
.2886	448.3000	767.8000	810.8000	707.1000	-131.7000	9348.0000	13120.0000	12180.0000	8707.0000
1057.0000	1354.0000	1573.0000	1806.0000	1946.0000	10860.0000	12400.0000	13960.0000	14730.0000	15120.0000
2105.0000	2272.0000	2280.0000	2116.0000	1632.0000	15390.0000	15770.0000	14780.0000	12340.0000	7067.0000
9.9800	366.8000	621.7000	662.5000	591.2000	-137.6000	9867.0000	13830.0000	13020.0000	9492.0000
873.1000	1113.0000	1293.0000	1484.0000	1603.0000	11940.0000	13750.0000	15640.0000	16710.0000	17390.0000
1741.0000	1896.0000	1931.0000	1830.0000	1484.0000	18070.0000	19220.0000	18860.0000	16390.0000	9767.0000
20.9600	297.0000	494.8000	535.6000	495.8000	-112.7000	8194.0000	11470.0000	10910.0000	8059.0000
719.1000	910.5000	1058.0000	1214.0000	1317.0000	10190.0000	11810.0000	13530.0000	14580.0000	15300.0000
1440.0000	1592.0000	1661.0000	1623.0000	1402.0000	16120.0000	17590.0000	17800.0000	15890.0000	9743.0000
15.1700	202.5000	336.6000	364.5000	338.1000	-85.3300	6429.0000	8993.0000	8590.0000	6382.0000
488.9000	617.7000	716.4000	820.7000	889.5000	8092.0000	9399.0000	10790.0000	11670.0000	12300.0000
970.6000	1069.0000	1111.0000	1083.0000	937.1000	13040.0000	14390.0000	14780.0000	13380.0000	8344.0000
100.4000	249.8000	362.4000	448.0000	531.7000	-66.0800	5124.0000	7165.0000	6857.0000	5109.0000
694.3000	842.0000	986.0000	1136.0000	1279.0000	6484.0000	7539.0000	8668.0000	9386.0000	9913.0000
1472.0000	1796.0000	2129.0000	2373.0000	2530.0000	10530.0000	11680.0000	12080.0000	11010.0000	6933.0000
-125.2000	7338.0000	10740.0000	9378.0000	6314.0000	-41.9300	3717.0000	5194.0000	4978.0000	3721.0000
8894.0000	10910.0000	12740.0000	13580.0000	14030.0000	4721.0000	5490.0000	6313.0000	6839.0000	7227.0000
14410.0000	14430.0000	13190.0000	10950.0000	6296.0000	7688.0000	8540.0000	8856.0000	8106.0000	5180.0000
-130.8000	7776.0000	11370.0000	10070.0000	6894.0000	-23.3700	2438.0000	3681.0000	3531.0000	2648.0000
9789.0000	12100.0000	14280.0000	15390.0000	16130.0000	3354.0000	3895.0000	4474.0000	4842.0000	5113.0000
16890.0000	17550.0000	16760.0000	14480.0000	8650.0000	5432.0000	6017.0000	6222.0000	5696.0000	3695.0000
-107.0000	6475.0000	9466.0000	8461.0000	5860.0000	-7.3820	2037.0000	2839.0000	2729.0000	2062.0000
8365.0000	10400.0000	12350.0000	13410.0000	14190.0000	2609.0000	3028.0000	3475.0000	3762.0000	3974.0000
15060.0000	16030.0000	15790.0000	14020.0000	8595.0000	4226.0000	4684.0000	4856.0000	4479.0000	3010.0000
-81.0100	5086.0000	7433.0000	6670.0000	4645.0000	-1.6140	1637.0000	2280.0000	2194.0000	1664.0000
6643.0000	8273.0000	9854.0000	10740.0000	11400.0000	2103.0000	2439.0000	2798.0000	3028.0000	3200.0000
12180.0000	13110.0000	13100.0000	11790.0000	7353.0000	3402.0000	3770.0000	3909.0000	3616.0000	2467.0000
-62.7300	4055.0000	5926.0000	5328.0000	3721.0000	7.9220	1335.0000	1857.0000	1794.0000	1375.0000
5325.0000	6637.0000	7914.0000	8636.0000	9188.0000	1735.0000	2012.0000	2308.0000	2500.0000	2646.0000
9839.0000	10650.0000	10710.0000	9703.0000	6108.0000	2820.0000	3135.0000	3270.0000	3059.0000	2172.0000
-39.7700	2944.0000	4299.0000	3872.0000	2717.0000	13.6500	1081.0000	1503.0000	1456.0000	1127.0000
3883.0000	4837.0000	5767.0000	6295.0000	6702.0000	1420.0000	1647.0000	1888.0000	2047.0000	2170.0000
7184.0000	7788.0000	7860.0000	7157.0000	4579.0000	2316.0000	2581.0000	2704.0000	2553.0000	1873.0000
-22.1300	2092.0000	3050.0000	2751.0000	1939.0000	21.5300	864.6000	1199.0000	1170.0000	921.8000
2763.0000	3437.0000	4091.0000	4461.0000	4746.0000	1160.0000	1345.0000	1542.0000	1675.0000	1780.0000
5081.0000	5496.0000	5537.0000	5047.0000	3284.0000	1909.0000	2139.0000	2264.0000	2173.0000	1678.0000
-6.9030	1618.0000	2355.0000	2132.0000	1520.0000	31.1300	673.4000	931.1000	919.2000	746.9000
2157.0000	2677.0000	3182.0000	3471.0000	3695.0000	937.3000	1087.0000	1248.0000	1361.0000	1454.0000

Figure C-2-Continued.

1571.0000	1780.0000	1915.0000	1885.0000	1558.0000	19750.0000	22570.0000	22990.0000	20040.0000	15180.0000
22.1600	457.3000	631.6000	623.5000	507.5000	-89.4500	4117.0000	6354.0000	7934.0000	8836.0000
635.7000	736.5000	844.0000	919.1000	980.9000	10780.0000	12050.0000	12970.0000	13930.0000	14750.0000
1057.0000	1193.0000	1277.0000	1254.0000	1037.0000	15960.0000	18450.0000	19070.0000	16880.0000	12980.0000
114.1000	395.8000	531.2000	601.0000	641.2000	-69.2600	3286.0000	5070.0000	6336.0000	7069.0000
794.9000	930.6000	1082.0000	1221.0000	1363.0000	8628.0000	9660.0000	10410.0000	11200.0000	11880.0000
1560.0000	1913.0000	2282.0000	2541.0000	2675.0000	12890.0000	14970.0000	15590.0000	13890.0000	10760.0000
-135.9000	8492.0000	12120.0000	12670.0000	10950.0000	-43.8700	2389.0000	3682.0000	4603.0000	5139.0000
12810.0000	14680.0000	15420.0000	16190.0000	16670.0000	6271.0000	7023.0000	7572.0000	8149.0000	8649.0000
16900.0000	17630.0000	16740.0000	13820.0000	8660.0000	9392.0000	10910.0000	11390.0000	10190.0000	7956.0000
-142.0000	8989.0000	12820.0000	13550.0000	11910.0000	-24.3600	1700.0000	2615.0000	3266.0000	3647.0000
14060.0000	16250.0000	17280.0000	18360.0000	19180.0000	4444.0000	4972.0000	5356.0000	5759.0000	6105.0000
19850.0000	21510.0000	21390.0000	18410.0000	12000.0000	6618.0000	7661.0000	7963.0000	7121.0000	5584.0000
-116.3000	7480.0000	10660.0000	11350.0000	10100.0000	-7.4930	1319.0000	2024.0000	2528.0000	2826.0000
12000.0000	13940.0000	14940.0000	16010.0000	16890.0000	3441.0000	3849.0000	4148.0000	4460.0000	4729.0000
17710.0000	19690.0000	20210.0000	17900.0000	11990.0000	5125.0000	5924.0000	6162.0000	5544.0000	4416.0000
-88.0800	5873.0000	8369.0000	8936.0000	7991.0000	-1.4410	1063.0000	1628.0000	2034.0000	2275.0000
9515.0000	11080.0000	11920.0000	12810.0000	13570.0000	2768.0000	3095.0000	3335.0000	3585.0000	3800.0000
14320.0000	16100.0000	16770.0000	15080.0000	10270.0000	4117.0000	4752.0000	4940.0000	4453.0000	3570.0000
-68.2200	4683.0000	6671.0000	7133.0000	6394.0000	8.6230	872.2000	1332.0000	1665.0000	1867.0000
7621.0000	8886.0000	9571.0000	10300.0000	10930.0000	2271.0000	2541.0000	2740.0000	2948.0000	3129.0000
11570.0000	13080.0000	13710.0000	12410.0000	8523.0000	3394.0000	3921.0000	4092.0000	3726.0000	3048.0000
-43.2600	3399.0000	4838.0000	5177.0000	4651.0000	14.6600	711.0000	1082.0000	1354.0000	1522.0000
5544.0000	6464.0000	6965.0000	7502.0000	7966.0000	1850.0000	2070.0000	2234.0000	2406.0000	2555.0000
8438.0000	9547.0000	10030.0000	9121.0000	6333.0000	2773.0000	3205.0000	3354.0000	3079.0000	2561.0000
-24.0900	2413.0000	3431.0000	3672.0000	3303.0000	22.9800	574.9000	870.6000	1091.0000	1232.0000
3933.0000	4580.0000	4931.0000	5306.0000	5628.0000	1497.0000	1676.0000	1813.0000	1956.0000	2082.0000
5954.0000	6714.0000	7032.0000	6390.0000	4480.0000	2266.0000	2624.0000	2767.0000	2580.0000	2208.0000
-7.5520	1865.0000	2648.0000	2838.0000	2564.0000	33.1200	456.5000	685.3000	861.2000	981.5000
3051.0000	3550.0000	3824.0000	4115.0000	4366.0000	1192.0000	1338.0000	1453.0000	1573.0000	1682.0000
4622.0000	5211.0000	5464.0000	4998.0000	3595.0000	1840.0000	2143.0000	2291.0000	2190.0000	1952.0000
-1.5970	1499.0000	2127.0000	2281.0000	2065.0000	23.5700	310.6000	465.5000	584.4000	665.5000
2456.0000	2856.0000	3076.0000	3310.0000	3512.0000	807.0000	904.7000	981.6000	1061.0000	1133.0000
3718.0000	4187.0000	4389.0000	4024.0000	2927.0000	1236.0000	1433.0000	1523.0000	1451.0000	1292.0000
8.2660	1224.0000	1734.0000	1864.0000	1698.0000	121.0000	326.8000	453.2000	591.0000	736.5000
2020.0000	2348.0000	2532.0000	2728.0000	2897.0000	898.7000	1034.0000	1172.0000	1314.0000	1465.0000
3074.0000	3469.0000	3653.0000	3384.0000	2538.0000	1679.0000	2069.0000	2447.0000	2690.0000	2857.0000
14.1900	993.2000	1404.0000	1513.0000	1386.0000	-138.8000	4624.0000	7541.0000	10240.0000	12070.0000
1649.0000	1916.0000	2068.0000	2229.0000	2370.0000	14860.0000	16710.0000	17810.0000	18640.0000	19070.0000
2519.0000	2846.0000	3008.0000	2810.0000	2161.0000	20810.0000	22940.0000	21240.0000	17290.0000	13690.0000
22.3400	795.9000	1123.0000	1215.0000	1125.0000	-145.1000	4935.0000	8060.0000	11010.0000	13130.0000
1339.0000	1555.0000	1683.0000	1818.0000	1938.0000	16290.0000	18470.0000	19920.0000	21110.0000	21920.0000
2067.0000	2346.0000	2499.0000	2372.0000	1901.0000	24400.0000	27930.0000	27130.0000	23070.0000	19000.0000
32.2600	622.4000	874.3000	953.9000	900.6000	-118.8000	4129.0000	6751.0000	9256.0000	11130.0000
1073.0000	1246.0000	1355.0000	1469.0000	1573.0000	13880.0000	15820.0000	17210.0000	18390.0000	19280.0000
1691.0000	1936.0000	2092.0000	2036.0000	1725.0000	21740.0000	25520.0000	25600.0000	22440.0000	18980.0000
22.9700	422.8000	593.2000	647.0000	611.0000	-89.9500	3251.0000	5315.0000	7300.0000	8801.0000
726.9000	843.2000	915.6000	991.4000	1060.0000	11000.0000	12570.0000	13720.0000	14710.0000	15490.0000
1137.0000	1296.0000	1393.0000	1351.0000	1146.0000	17560.0000	20840.0000	21230.0000	18890.0000	16200.0000
118.1000	382.3000	516.3000	619.3000	702.9000	-69.6300	2596.0000	4244.0000	5832.0000	7041.0000
851.0000	995.7000	1130.0000	1270.0000	1418.0000	8808.0000	10080.0000	11010.0000	11830.0000	12470.0000
1616.0000	1985.0000	2365.0000	2621.0000	2761.0000	14180.0000	16910.0000	17340.0000	15540.0000	13420.0000
-138.0000	5884.0000	9070.0000	11170.0000	12130.0000	-44.0500	1889.0000	3085.0000	4238.0000	5119.0000
14560.0000	15990.0000	16810.0000	17630.0000	18140.0000	6402.0000	7325.0000	8004.0000	8602.0000	9076.0000
18850.0000	20240.0000	19040.0000	15440.0000	10940.0000	10320.0000	12310.0000	12650.0000	11380.0000	9879.0000
-144.3000	6266.0000	9664.0000	11990.0000	13190.0000	-24.3900	1347.0000	2193.0000	3010.0000	3633.0000
15960.0000	17690.0000	18820.0000	19980.0000	20860.0000	4536.0000	5184.0000	5659.0000	6075.0000	6404.0000
22130.0000	24670.0000	24340.0000	20600.0000	15190.0000	7264.0000	8627.0000	8830.0000	7934.0000	6891.0000
-118.2000	5234.0000	8077.0000	10070.0000	11170.0000	-7.3670	1049.0000	1701.0000	2332.0000	2816.0000
13590.0000	15160.0000	16260.0000	17410.0000	18360.0000	3512.0000	4011.0000	4379.0000	4700.0000	4956.0000

Figure C-2-Continued.

5614.0000	6652.0000	6812.0000	6149.0000	5385.0000
-1.2780	846.4000	1370.0000	1877.0000	2266.0000
2824.0000	3224.0000	3519.0000	3776.0000	3981.0000
4505.0000	5328.0000	5452.0000	4929.0000	4330.0000
8.8880	697.9000	1124.0000	1539.0000	1861.0000
2317.0000	2645.0000	2888.0000	3102.0000	3274.0000
3705.0000	4380.0000	4500.0000	4103.0000	3648.0000
14.9800	571.4000	916.0000	1253.0000	1517.0000
1886.0000	2153.0000	2353.0000	2528.0000	2671.0000
3021.0000	3568.0000	3676.0000	3375.0000	3031.0000
23.3800	465.6000	740.4000	1012.0000	1228.0000
1525.0000	1742.0000	1906.0000	2052.0000	2173.0000
2458.0000	2906.0000	3015.0000	2808.0000	2567.0000
33.6400	374.6000	587.7000	802.3000	979.2000
1214.0000	1387.0000	1523.0000	1646.0000	1750.0000
1984.0000	2353.0000	2474.0000	2358.0000	2215.0000
23.9400	255.1000	399.5000	544.7000	664.0000
821.8000	937.9000	1028.0000	1109.0000	1178.0000
1332.0000	1571.0000	1644.0000	1561.0000	1462.0000
122.7000	299.5000	420.7000	572.6000	738.7000
910.0000	1055.0000	1201.0000	1345.0000	1493.0000
1734.0000	2149.0000	2517.0000	2755.0000	2954.0000
-140.4000	6060.0000	9068.0000	10900.0000	11700.0000
14780.0000	16970.0000	18330.0000	18970.0000	19080.0000
21970.0000	24910.0000	22970.0000	19420.0000	16110.0000
-146.8000	6453.0000	9665.0000	11710.0000	12730.0000
16200.0000	18760.0000	20490.0000	21490.0000	21940.0000
25730.0000	30260.0000	29290.0000	25850.0000	22320.0000
-120.3000	5391.0000	8080.0000	9838.0000	10790.0000
13800.0000	16080.0000	17690.0000	18710.0000	19300.0000
22910.0000	27610.0000	27620.0000	25090.0000	22270.0000
-91.0600	4241.0000	6356.0000	7756.0000	8539.0000
10940.0000	12770.0000	14100.0000	14970.0000	15500.0000
18490.0000	22530.0000	22880.0000	21090.0000	18990.0000
-70.5100	3384.0000	5072.0000	6195.0000	6832.0000
8761.0000	10240.0000	11310.0000	12030.0000	12490.0000
14930.0000	18260.0000	18680.0000	17340.0000	15720.0000
-44.6700	2460.0000	3684.0000	4501.0000	4968.0000
6368.0000	7440.0000	8225.0000	8749.0000	9088.0000
10860.0000	13290.0000	13620.0000	12680.0000	11530.0000
-24.8100	1750.0000	2616.0000	3195.0000	3526.0000
4512.0000	5265.0000	5814.0000	6178.0000	6412.0000
7639.0000	9303.0000	9493.0000	8820.0000	8014.0000
-7.6610	1358.0000	2025.0000	2474.0000	2735.0000
3494.0000	4073.0000	4496.0000	4779.0000	4961.0000
5898.0000	7160.0000	7308.0000	6810.0000	6218.0000
-1.5010	1094.0000	1629.0000	1990.0000	2202.0000
2809.0000	3273.0000	3612.0000	3839.0000	3985.0000
4731.0000	5730.0000	5843.0000	5448.0000	4982.0000
8.7340	897.5000	1333.0000	1630.0000	1809.0000
2305.0000	2684.0000	2964.0000	3152.0000	3278.0000
3885.0000	4701.0000	4810.0000	4514.0000	4162.0000
14.8700	731.4000	1083.0000	1326.0000	1475.0000
1877.0000	2185.0000	2413.0000	2568.0000	2674.0000
3164.0000	3822.0000	3920.0000	3698.0000	3433.0000
23.3300	591.2000	871.7000	1069.0000	1196.0000
1518.0000	1766.0000	1953.0000	2083.0000	2175.0000
2570.0000	3102.0000	3203.0000	3054.0000	2873.0000
33.6400	469.1000	686.5000	845.5000	955.0000
1209.0000	1406.0000	1559.0000	1669.0000	1752.0000

2067.0000	2498.0000	2613.0000	2538.0000	2438.0000
23.9500	319.1000	466.3000	573.8000	647.7000
818.4000	950.4000	1052.0000	1125.0000	1180.0000
1387.0000	1667.0000	1735.0000	1678.0000	1607.0000
123.0000	333.4000	456.1000	588.5000	730.8000
909.0000	1063.0000	1214.0000	1354.0000	1496.0000
1764.0000	2199.0000	2564.0000	2813.0000	3028.0000
-140.9000	9706.0000	13170.0000	13410.0000	11660.0000
14850.0000	17180.0000	18420.0000	18780.0000	18530.0000
21840.0000	25300.0000	23870.0000	21760.0000	17430.0000
-147.4000	10250.0000	13900.0000	14340.0000	12680.0000
16270.0000	18980.0000	20590.0000	21260.0000	21310.0000
25560.0000	30700.0000	30380.0000	28870.0000	24070.0000
-120.7000	8518.0000	11550.0000	12010.0000	10750.0000
13860.0000	16260.0000	17770.0000	18510.0000	18750.0000
22750.0000	27990.0000	28610.0000	27960.0000	23950.0000
-91.4500	6684.0000	9059.0000	9451.0000	8508.0000
10980.0000	12910.0000	14160.0000	14810.0000	15060.0000
18360.0000	22830.0000	23680.0000	23470.0000	20380.0000
-70.8400	5327.0000	7219.0000	7544.0000	6807.0000
8794.0000	10350.0000	11370.0000	11900.0000	12130.0000
14820.0000	18510.0000	19320.0000	19270.0000	16850.0000
-44.9600	3864.0000	5234.0000	5474.0000	4950.0000
6392.0000	7521.0000	8261.0000	8656.0000	8832.0000
10780.0000	13460.0000	14080.0000	14070.0000	12350.0000
-25.0800	2742.0000	3710.0000	3881.0000	3513.0000
4529.0000	5322.0000	5839.0000	6114.0000	6233.0000
7587.0000	9423.0000	9814.0000	9772.0000	8574.0000
-7.9580	2118.0000	2862.0000	2998.0000	2725.0000
3506.0000	4116.0000	4515.0000	4729.0000	4826.0000
5858.0000	7251.0000	7548.0000	7519.0000	6632.0000
-1.7770	1702.0000	2298.0000	2409.0000	2194.0000
2819.0000	3307.0000	3628.0000	3799.0000	3878.0000
4699.0000	5802.0000	6033.0000	6006.0000	5307.0000
8.4290	1388.0000	1873.0000	1968.0000	1802.0000
2313.0000	2712.0000	2976.0000	3121.0000	3191.0000
3860.0000	4758.0000	4960.0000	4954.0000	4418.0000
14.5700	1124.0000	1516.0000	1596.0000	1470.0000
1883.0000	2206.0000	2422.0000	2543.0000	2605.0000
3144.0000	3867.0000	4038.0000	4043.0000	3632.0000
23.0000	899.3000	1210.0000	1281.0000	1192.0000
1523.0000	1783.0000	1960.0000	2063.0000	2121.0000
2553.0000	3136.0000	3293.0000	3318.0000	3024.0000
33.2600	700.8000	940.9000	1004.0000	951.5000
1212.0000	1418.0000	1564.0000	1654.0000	1712.0000
2054.0000	2523.0000	2678.0000	2730.0000	2546.0000
23.6800	475.8000	638.2000	680.9000	645.3000
820.6000	958.7000	1056.0000	1115.0000	1153.0000
1379.0000	1683.0000	1778.0000	1804.0000	1677.0000
121.9000	414.3000	544.8000	643.2000	728.1000
908.4000	1066.0000	1214.0000	1346.0000	1479.0000
1756.0000	2202.0000	2579.0000	2868.0000	3049.0000
-140.3000	12280.0000	16000.0000	15170.0000	12090.0000
15280.0000	17440.0000	18530.0000	18680.0000	18100.0000
20600.0000	23610.0000	24040.0000	23980.0000	17430.0000
-146.7000	12870.0000	16750.0000	16140.0000	13130.0000
16720.0000	19250.0000	20690.0000	21130.0000	20800.0000
24120.0000	28650.0000	30540.0000	31690.0000	23990.0000
-120.2000	10640.0000	13830.0000	13480.0000	11130.0000
14230.0000	16470.0000	17840.0000	18390.0000	18300.0000

Figure C-2-Continued.

21470.0000	26110.0000	28710.0000	30600.0000	23830.0000
-91.0700	8332.0000	10820.0000	10600.0000	8800.0000
11280.0000	13080.0000	14210.0000	14700.0000	14700.0000
17340.0000	21300.0000	23750.0000	25630.0000	20260.0000
-70.5700	6634.0000	8616.0000	8451.0000	7039.0000
9026.0000	10480.0000	11410.0000	11820.0000	11840.0000
13990.0000	17270.0000	19370.0000	21030.0000	16750.0000
-44.8900	4807.0000	6240.0000	6129.0000	5118.0000
6559.0000	7616.0000	8290.0000	8595.0000	8620.0000
10190.0000	12570.0000	14120.0000	15330.0000	12270.0000
-25.1500	3407.0000	4419.0000	4342.0000	3631.0000
4646.0000	5389.0000	5859.0000	6071.0000	6086.0000
7172.0000	8808.0000	9840.0000	10640.0000	8522.0000
-8.2220	2627.0000	3403.0000	3350.0000	2815.0000
3595.0000	4166.0000	4530.0000	4697.0000	4714.0000
5544.0000	6788.0000	7567.0000	8161.0000	6593.0000
-2.0740	2109.0000	2731.0000	2691.0000	2265.0000
2891.0000	3348.0000	3639.0000	3774.0000	3788.0000
4450.0000	5436.0000	6048.0000	6511.0000	5277.0000
8.0080	1716.0000	2222.0000	2195.0000	1860.0000
2370.0000	2744.0000	2985.0000	3100.0000	3119.0000
3660.0000	4465.0000	4971.0000	5353.0000	4392.0000
14.0800	1387.0000	1795.0000	1778.0000	1516.0000
1929.0000	2232.0000	2429.0000	2526.0000	2547.0000
2984.0000	3635.0000	4046.0000	4356.0000	3611.0000
22.4000	1105.0000	1429.0000	1422.0000	1227.0000
1558.0000	1803.0000	1965.0000	2049.0000	2076.0000
2429.0000	2956.0000	3298.0000	3556.0000	3006.0000
32.5200	855.3000	1105.0000	1110.0000	977.5000
1238.0000	1432.0000	1567.0000	1643.0000	1677.0000
1961.0000	2388.0000	2680.0000	2902.0000	2530.0000
23.1600	580.3000	749.1000	752.5000	662.8000
837.9000	968.1000	1058.0000	1108.0000	1129.0000
1317.0000	1595.0000	1779.0000	1916.0000	1668.0000
119.6000	466.4000	599.8000	677.1000	733.4000
913.0000	1066.0000	1209.0000	1336.0000	1459.0000
1715.0000	2144.0000	2566.0000	2909.0000	3023.0000
-135.7000	11090.0000	14520.0000	14450.0000	12490.0000
15630.0000	17750.0000	18830.0000	18970.0000	18370.0000
19060.0000	20930.0000	23870.0000	25660.0000	16260.0000
-141.8000	11650.0000	15240.0000	15390.0000	13550.0000
17080.0000	19560.0000	20990.0000	21430.0000	21080.0000
22310.0000	25400.0000	30220.0000	33710.0000	22310.0000
-116.2000	9650.0000	12620.0000	12860.0000	11470.0000
14520.0000	16720.0000	18090.0000	18620.0000	18520.0000
19860.0000	23170.0000	28340.0000	32400.0000	22110.0000
-88.0000	7562.0000	9886.0000	10110.0000	9066.0000
11500.0000	13270.0000	14400.0000	14890.0000	14870.0000
16040.0000	18910.0000	23420.0000	27080.0000	18790.0000
-68.1700	6023.0000	7873.0000	8065.0000	7251.0000
9204.0000	10630.0000	11550.0000	11960.0000	11970.0000
12950.0000	15330.0000	19100.0000	22190.0000	15530.0000
-43.3300	4366.0000	5704.0000	5850.0000	5270.0000
6687.0000	7722.0000	8396.0000	8698.0000	8715.0000
9431.0000	11180.0000	13910.0000	16170.0000	11390.0000
-24.2400	3096.0000	4041.0000	4145.0000	3739.0000
4736.0000	5463.0000	5934.0000	6143.0000	6152.0000
6647.0000	7843.0000	9704.0000	11210.0000	7923.0000
-7.8490	2388.0000	3114.0000	3199.0000	2896.0000
3664.0000	4223.0000	4587.0000	4751.0000	4764.0000

5146.0000	6061.0000	7466.0000	8591.0000	6148.0000
-1.9060	1918.0000	2500.0000	2570.0000	2330.0000
2945.0000	3393.0000	3684.0000	3817.0000	3828.0000
4133.0000	4860.0000	5968.0000	6849.0000	4927.0000
7.8630	1562.0000	2035.0000	2097.0000	1912.0000
2413.0000	2779.0000	3020.0000	3134.0000	3150.0000
3406.0000	4005.0000	4907.0000	5620.0000	4115.0000
13.7500	1263.0000	1645.0000	1699.0000	1557.0000
1963.0000	2260.0000	2457.0000	2553.0000	2571.0000
2782.0000	3270.0000	3995.0000	4564.0000	3393.0000
21.8100	1008.0000	1311.0000	1360.0000	1259.0000
1584.0000	1824.0000	1986.0000	2069.0000	2093.0000
2271.0000	2673.0000	3257.0000	3714.0000	2837.0000
31.6200	781.4000	1016.0000	1063.0000	1000.0000
1256.0000	1447.0000	1581.0000	1656.0000	1689.0000
1842.0000	2176.0000	2648.0000	3015.0000	2403.0000
22.5200	530.4000	688.8000	720.6000	678.2000
850.4000	978.1000	1067.0000	1117.0000	1137.0000
1237.0000	1455.0000	1758.0000	1991.0000	1586.0000
116.2000	436.5000	563.9000	655.3000	735.2000
912.6000	1063.0000	1206.0000	1331.0000	1453.0000
1661.0000	2055.0000	2532.0000	2919.0000	2951.0000
-128.2000	6075.0000	8688.0000	10810.0000	12340.0000
15630.0000	17900.0000	19200.0000	19730.0000	19500.0000
18230.0000	18900.0000	24330.0000	26910.0000	14920.0000
-134.0000	6457.0000	9247.0000	11590.0000	13370.0000
17060.0000	19690.0000	21350.0000	22220.0000	22300.0000
21310.0000	22910.0000	30670.0000	35160.0000	20340.0000
-109.7000	5388.0000	7723.0000	9722.0000	11310.0000
14490.0000	16810.0000	18370.0000	19280.0000	19540.0000
18950.0000	20890.0000	28680.0000	33660.0000	20090.0000
-83.0200	4235.0000	6073.0000	7660.0000	8939.0000
11470.0000	13340.0000	14620.0000	15390.0000	15670.0000
15300.0000	17050.0000	23670.0000	28070.0000	17040.0000
-64.2900	3379.0000	4845.0000	6116.0000	7148.0000
9178.0000	10680.0000	11720.0000	12360.0000	12610.0000
12350.0000	13830.0000	19290.0000	22980.0000	14070.0000
-40.7500	2456.0000	3519.0000	4443.0000	5195.0000
6667.0000	7760.0000	8517.0000	8988.0000	9177.0000
9000.0000	10090.0000	14050.0000	16730.0000	10340.0000
-22.6700	1746.0000	2499.0000	3153.0000	3686.0000
4723.0000	5490.0000	6019.0000	6346.0000	6475.0000
6347.0000	7090.0000	9800.0000	11600.0000	7211.0000
-7.0660	1354.0000	1934.0000	2441.0000	2855.0000
3653.0000	4243.0000	4651.0000	4905.0000	5008.0000
4918.0000	5492.0000	7537.0000	8881.0000	5618.0000
-1.4510	1090.0000	1556.0000	1963.0000	2297.0000
2936.0000	3408.0000	3735.0000	3939.0000	4022.0000
3952.0000	4410.0000	6025.0000	7079.0000	4512.0000
7.8610	893.6000	1273.0000	1607.0000	1884.0000
2405.0000	2791.0000	3060.0000	3231.0000	3305.0000
3260.0000	3645.0000	4950.0000	5800.0000	3783.0000
13.4500	727.4000	1034.0000	1307.0000	1534.0000
1956.0000	2269.0000	2488.0000	2629.0000	2694.0000
2665.0000	2984.0000	4029.0000	4705.0000	3132.0000
21.1500	586.8000	831.9000	1052.0000	1240.0000
1578.0000	1830.0000	2009.0000	2128.0000	2187.0000
2179.0000	2450.0000	3281.0000	3819.0000	2634.0000
30.5300	464.0000	654.5000	830.5000	985.4000
1250.0000	1450.0000	1597.0000	1698.0000	1757.0000

Figure C-2-Continued.

1771.0000	2008.0000	2662.0000	3088.0000	2250.0000
21.7300	315.6000	444.6000	563.7000	668.2000
846.4000	980.2000	1078.0000	1145.0000	1183.0000
1190.0000	1344.0000	1768.0000	2040.0000	1487.0000
111.7000	319.0000	430.4000	566.3000	721.6000
900.9000	1053.0000	1199.0000	1332.0000	1462.0000
1619.0000	1976.0000	2510.0000	2912.0000	2859.0000
-23.0700	614.6000	2482.0000	6873.0000	11710.0000
15180.0000	17720.0000	19460.0000	20540.0000	20970.0000
18640.0000	19030.0000	26030.0000	27660.0000	13880.0000
-22.4000	659.3000	2664.0000	7403.0000	12690.0000
16550.0000	19470.0000	21600.0000	23060.0000	23870.0000
21710.0000	22990.0000	32600.0000	35910.0000	18820.0000
-16.7300	554.6000	2239.0000	6234.0000	10730.0000
14050.0000	16600.0000	18550.0000	19960.0000	20850.0000
19270.0000	20900.0000	30360.0000	34230.0000	18510.0000
-10.2100	440.5000	1768.0000	4920.0000	8477.0000
11120.0000	13170.0000	14750.0000	15920.0000	16700.0000
15540.0000	17040.0000	24990.0000	28490.0000	15680.0000
-6.3350	354.2000	1414.0000	3933.0000	6779.0000
8898.0000	10540.0000	11820.0000	12780.0000	13430.0000
12540.0000	13820.0000	20340.0000	23300.0000	12940.0000
.9344	265.1000	1036.0000	2863.0000	4928.0000
6464.0000	7657.0000	8589.0000	9288.0000	9763.0000
9134.0000	10080.0000	14810.0000	16960.0000	9514.0000
6.5330	196.7000	744.1000	2039.0000	3497.0000
4580.0000	5418.0000	6070.0000	6557.0000	6886.0000
6441.0000	7084.0000	10330.0000	11760.0000	6652.0000
14.8100	165.9000	589.6000	1587.0000	2711.0000
3543.0000	4187.0000	4689.0000	5064.0000	5319.0000
4989.0000	5487.0000	7930.0000	9002.0000	5200.0000
15.8600	139.0000	479.8000	1281.0000	2181.0000
2848.0000	3364.0000	3765.0000	4065.0000	4269.0000
4008.0000	4405.0000	6336.0000	7174.0000	4184.0000
21.3900	125.5000	404.3000	1056.0000	1790.0000
2334.0000	2754.0000	3083.0000	3331.0000	3502.0000
3303.0000	3639.0000	5196.0000	5874.0000	3521.0000
23.9500	111.1000	337.7000	864.9000	1459.0000
1898.0000	2238.0000	2506.0000	2709.0000	2850.0000
2698.0000	2978.0000	4221.0000	4762.0000	2923.0000
28.8600	102.7000	284.9000	705.4000	1180.0000
1532.0000	1805.0000	2022.0000	2188.0000	2307.0000
2203.0000	2443.0000	3427.0000	3860.0000	2471.0000
35.6100	98.7600	242.1000	568.6000	938.7000
1214.0000	1430.0000	1604.0000	1741.0000	1844.0000
1786.0000	2000.0000	2765.0000	3114.0000	2124.0000
25.1200	68.3900	165.7000	386.8000	636.7000
822.0000	966.6000	1083.0000	1174.0000	1241.0000
1201.0000	1339.0000	1837.0000	2058.0000	1407.0000
108.5000	183.0000	277.0000	465.0000	694.5000
876.2000	1033.0000	1187.0000	1331.0000	1473.0000
1604.0000	1947.0000	2513.0000	2882.0000	2773.0000
-116.0000	-2754.0000	-1225.0000	4430.0000	11050.0000
14570.0000	17230.0000	19240.0000	20730.0000	21820.0000
19960.0000	21470.0000	28840.0000	28030.0000	13530.0000
-121.1000	-2931.0000	-1309.0000	4780.0000	11960.0000
15870.0000	18900.0000	21300.0000	23200.0000	24740.0000
23150.0000	25770.0000	35840.0000	36140.0000	18210.0000
-99.0600	-2446.0000	-1094.0000	4030.0000	10110.0000
13460.0000	16100.0000	18260.0000	20040.0000	21550.0000

20480.0000	23330.0000	33170.0000	34290.0000	17830.0000
-75.0000	-1918.0000	-855.3000	3184.0000	7986.0000
10650.0000	12760.0000	14510.0000	15970.0000	17240.0000
16490.0000	18970.0000	27230.0000	28470.0000	15060.0000
-58.0900	-1527.0000	-679.0000	2547.0000	6386.0000
8524.0000	10220.0000	11630.0000	12820.0000	13860.0000
13300.0000	15360.0000	22130.0000	23260.0000	12420.0000
-36.9000	-1098.0000	-481.3000	1860.0000	4643.0000
6193.0000	7423.0000	8450.0000	9312.0000	10070.0000
9677.0000	11190.0000	16090.0000	16920.0000	9134.0000
-20.6200	-768.0000	-329.1000	1330.0000	3296.0000
4389.0000	5253.0000	5973.0000	6575.0000	7100.0000
6820.0000	7858.0000	11210.0000	11750.0000	6395.0000
-6.6080	-574.1000	-233.3000	1044.0000	2556.0000
3396.0000	4061.0000	4614.0000	5076.0000	5480.0000
5274.0000	6069.0000	8595.0000	8992.0000	5006.0000
-1.5400	-453.8000	-179.0000	845.5000	2058.0000
2731.0000	3263.0000	3705.0000	4075.0000	4398.0000
4235.0000	4867.0000	6861.0000	7168.0000	4032.0000
6.8120	-353.6000	-128.0000	704.7000	1690.0000
2238.0000	2672.0000	3034.0000	3337.0000	3603.0000
3483.0000	4005.0000	5612.0000	5867.0000	3396.0000
11.8400	-273.6000	-89.6400	582.6000	1377.0000
1821.0000	2172.0000	2466.0000	2713.0000	2929.0000
2840.0000	3267.0000	4548.0000	4755.0000	2823.0000
18.7400	-199.9000	-51.0600	483.2000	1115.0000
1470.0000	1751.0000	1989.0000	2190.0000	2367.0000
2311.0000	2664.0000	3676.0000	3852.0000	2389.0000
27.1400	-130.2000	-11.9500	400.1000	888.4000
1166.0000	1387.0000	1577.0000	1740.0000	1886.0000
1863.0000	2159.0000	2944.0000	3103.0000	2058.0000
19.3300	-86.6100	-6.1500	273.0000	602.8000
789.6000	938.4000	1065.0000	1173.0000	1270.0000
1252.0000	1445.0000	1956.0000	2052.0000	1364.0000
99.6500	94.0500	178.3000	395.2000	664.4000
845.1000	1002.0000	1160.0000	1311.0000	1466.0000
1606.0000	1972.0000	2537.0000	2835.0000	2699.0000
-107.5000	-2640.0000	-1020.0000	4557.0000	10860.0000
14160.0000	16570.0000	18540.0000	20230.0000	21680.0000
21210.0000	25290.0000	32100.0000	28120.0000	13750.0000
-112.2000	-2807.0000	-1088.0000	4909.0000	11740.0000
15400.0000	18140.0000	20490.0000	22590.0000	24500.0000
24460.0000	30080.0000	39500.0000	35990.0000	18350.0000
-91.7300	-2342.0000	-908.3000	4135.0000	9907.0000
13050.0000	15440.0000	17550.0000	19490.0000	21300.0000
21550.0000	27060.0000	36300.0000	33980.0000	17860.0000
-69.4500	-1835.0000	-709.3000	3265.0000	7824.0000
10320.0000	12240.0000	13940.0000	15520.0000	17020.0000
17330.0000	21940.0000	29700.0000	28150.0000	15050.0000
-53.7800	-1461.0000	-562.6000	2611.0000	6255.0000
8256.0000	9794.0000	11170.0000	12450.0000	13670.0000
13960.0000	17740.0000	24100.0000	22970.0000	12390.0000
-34.1600	-1051.0000	-397.5000	1905.0000	4548.0000
5999.0000	7115.0000	8115.0000	9047.0000	9935.0000
10150.0000	12900.0000	17490.0000	16710.0000	9105.0000
-19.0800	-735.4000	-270.5000	1361.0000	3229.0000
4252.0000	5037.0000	5738.0000	6390.0000	7008.0000
7152.0000	9044.0000	12180.0000	11610.0000	6379.0000
-6.1060	-550.0000	-189.4000	1067.0000	2503.0000
3291.0000	3895.0000	4434.0000	4935.0000	5409.0000

Figure C-2-Continued.

5525.0000	6963.0000	9326.0000	8891.0000	4991.0000
-1.4130	-434.8000	-144.4000	863.6000	2015.0000
2646.0000	3130.0000	3562.0000	3962.0000	4341.0000
4434.0000	5575.0000	7439.0000	7089.0000	4019.0000
6.3250	-339.1000	-100.9000	718.3000	1654.0000
2169.0000	2564.0000	2917.0000	3245.0000	3556.0000
3640.0000	4569.0000	6070.0000	5802.0000	3382.0000
10.9800	-262.6000	-68.6200	592.7000	1348.0000
1764.0000	2085.0000	2372.0000	2638.0000	2891.0000
2964.0000	3713.0000	4909.0000	4704.0000	2809.0000
17.3800	-192.2000	-35.6000	490.0000	1091.0000
1424.0000	1682.0000	1914.0000	2129.0000	2335.0000
2405.0000	3006.0000	3951.0000	3809.0000	2373.0000
25.1600	-125.5000	-1.7160	403.6000	868.3000
1129.0000	1333.0000	1518.0000	1692.0000	1859.0000
1929.0000	2409.0000	3143.0000	3066.0000	2038.0000
17.9200	-83.5900	.6656	275.2000	589.3000
765.2000	901.8000	1026.0000	1141.0000	1252.0000
1297.0000	1611.0000	2088.0000	2030.0000	1353.0000
92.3900	87.4000	172.3000	384.9000	643.4000
816.3000	965.0000	1119.0000	1272.0000	1432.0000
1600.0000	2023.0000	2563.0000	2773.0000	2636.0000
-99.3900	-29.8700	1902.0000	6654.0000	11360.0000
14300.0000	16180.0000	17790.0000	19390.0000	20820.0000
21900.0000	28610.0000	34960.0000	27940.0000	14300.0000
-103.6000	-29.1000	2036.0000	7137.0000	12240.0000
15510.0000	17680.0000	19630.0000	21610.0000	23470.0000
25120.0000	33720.0000	42570.0000	35470.0000	18900.0000
-84.7100	-21.8100	1708.0000	5993.0000	10310.0000
13120.0000	15030.0000	16790.0000	18610.0000	20370.0000
22060.0000	30130.0000	38840.0000	33320.0000	18280.0000
-64.1400	-13.3700	1348.0000	4724.0000	8137.0000
10370.0000	11900.0000	13330.0000	14820.0000	16270.0000
17710.0000	24350.0000	31670.0000	27530.0000	15350.0000
-49.6800	-8.3370	1079.0000	3774.0000	6502.0000
8292.0000	9525.0000	10680.0000	11890.0000	13070.0000
14250.0000	19660.0000	25650.0000	22450.0000	12620.0000
-31.6000	1.0750	790.8000	2746.0000	4725.0000
6024.0000	6919.0000	7759.0000	8636.0000	9497.0000
10360.0000	14270.0000	18600.0000	16330.0000	9264.0000
-17.7100	8.3210	569.4000	1955.0000	3354.0000
4269.0000	4899.0000	5489.0000	6102.0000	6702.0000
7302.0000	10000.0000	12950.0000	11360.0000	6491.0000
-5.7890	19.0000	453.0000	1520.0000	2597.0000
3303.0000	3789.0000	4243.0000	4715.0000	5176.0000
5637.0000	7686.0000	9905.0000	8702.0000	5071.0000
-1.4570	20.3500	369.4000	1226.0000	2090.0000
2655.0000	3045.0000	3409.0000	3786.0000	4155.0000
4523.0000	6149.0000	7898.0000	6943.0000	4082.0000
5.6500	27.4700	312.7000	1009.0000	1713.0000
2175.0000	2494.0000	2793.0000	3103.0000	3405.0000
3709.0000	5025.0000	6433.0000	5683.0000	3427.0000
9.9360	30.7700	262.3000	824.9000	1395.0000
1768.0000	2028.0000	2271.0000	2523.0000	2769.0000
3018.0000	4073.0000	5195.0000	4609.0000	2841.0000
15.8100	37.0900	222.8000	670.7000	1126.0000
1426.0000	1635.0000	1833.0000	2038.0000	2238.0000
2444.0000	3282.0000	4169.0000	3732.0000	2392.0000
22.9500	45.7600	191.2000	537.6000	892.3000
1128.0000	1296.0000	1455.0000	1620.0000	1783.0000

1954.0000	2609.0000	3298.0000	3003.0000	2044.0000
16.3500	32.2700	131.1000	365.7000	605.5000
764.3000	876.8000	983.7000	1093.0000	1201.0000
1314.0000	1745.0000	2193.0000	1990.0000	1358.0000
84.4900	139.4000	230.5000	419.8000	636.5000
798.2000	932.2000	1075.0000	1222.0000	1378.0000
1578.0000	2055.0000	2570.0000	2699.0000	2577.0000
-145.9000	2715.0000	5099.0000	9024.0000	12620.0000
14850.0000	16210.0000	17370.0000	19070.0000	20400.0000
21860.0000	30360.0000	36890.0000	27910.0000	15030.0000
-152.9000	2885.0000	5427.0000	9623.0000	13540.0000
16040.0000	17660.0000	19110.0000	21180.0000	22910.0000
24980.0000	35490.0000	44480.0000	35160.0000	19680.0000
-125.8000	2408.0000	4532.0000	8047.0000	11370.0000
13540.0000	14980.0000	16320.0000	18210.0000	19840.0000
21880.0000	31530.0000	40310.0000	32850.0000	18910.0000
-96.6000	1894.0000	3564.0000	6332.0000	8959.0000
10690.0000	11850.0000	12950.0000	14480.0000	15830.0000
17540.0000	25420.0000	32760.0000	27080.0000	15820.0000
-75.6900	1512.0000	2844.0000	5053.0000	7154.0000
8542.0000	9483.0000	10370.0000	11610.0000	12710.0000
14110.0000	20500.0000	26490.0000	22060.0000	12990.0000
-50.8700	1102.0000	2069.0000	3670.0000	5195.0000
6203.0000	6887.0000	7534.0000	8436.0000	9236.0000
10260.0000	14870.0000	19200.0000	16040.0000	9526.0000
-31.8300	786.7000	1473.0000	2607.0000	3684.0000
4395.0000	4877.0000	5331.0000	5963.0000	6521.0000
7228.0000	10420.0000	13380.0000	11170.0000	6674.0000
-17.3800	614.7000	1144.0000	2018.0000	2849.0000
3397.0000	3770.0000	4122.0000	4607.0000	5037.0000
5580.0000	8002.0000	10220.0000	8561.0000	5205.0000
-11.0600	496.9000	922.0000	1623.0000	2291.0000
2731.0000	3029.0000	3312.0000	3700.0000	4043.0000
4477.0000	6399.0000	8151.0000	6832.0000	4186.0000
-2.7780	411.3000	757.7000	1329.0000	1874.0000
2234.0000	2480.0000	2713.0000	3032.0000	3314.0000
3671.0000	5223.0000	6633.0000	5593.0000	3504.0000
2.6400	338.0000	618.3000	1080.0000	1522.0000
1815.0000	2015.0000	2206.0000	2465.0000	2695.0000
2985.0000	4229.0000	5352.0000	4536.0000	2899.0000
9.2930	277.2000	500.9000	869.4000	1224.0000
1460.0000	1624.0000	1781.0000	1990.0000	2178.0000
2416.0000	3400.0000	4287.0000	3672.0000	2431.0000
16.9600	225.1000	398.9000	685.2000	963.8000
1151.0000	1284.0000	1413.0000	1581.0000	1734.0000
1929.0000	2692.0000	3380.0000	2952.0000	2064.0000
12.2100	153.6000	271.5000	465.4000	653.7000
780.1000	869.1000	955.2000	1068.0000	1169.0000
1298.0000	1801.0000	2249.0000	1959.0000	1372.0000
74.8700	193.6000	292.9000	458.4000	645.2000
787.5000	907.2000	1036.0000	1182.0000	1332.0000
1537.0000	2043.0000	2549.0000	2627.0000	2521.0000
-77.9100	4162.0000	6989.0000	10670.0000	13410.0000
15430.0000	16500.0000	17530.0000	19420.0000	20950.0000
21690.0000	30540.0000	37600.0000	28110.0000	15390.0000
-81.0600	4408.0000	7397.0000	11310.0000	14330.0000
16600.0000	17910.0000	19220.0000	21470.0000	23420.0000
24670.0000	35460.0000	44960.0000	35080.0000	19960.0000
-66.1600	3668.0000	6155.0000	9422.0000	12000.0000
13970.0000	15150.0000	16370.0000	18400.0000	20210.0000

Figure C-2-Continued.

21540.0000	31370.0000	40510.0000	32570.0000	19040.0000
-50.0200	2881.0000	4832.0000	7401.0000	9444.0000
11020.0000	11980.0000	12980.0000	14620.0000	16100.0000
17240.0000	25240.0000	32840.0000	26770.0000	15890.0000
-38.7100	2297.0000	3853.0000	5902.0000	7537.0000
8801.0000	9578.0000	10390.0000	11710.0000	12920.0000
13860.0000	20330.0000	26530.0000	21780.0000	13020.0000
-24.5300	1670.0000	2797.0000	4282.0000	5470.0000
6388.0000	6954.0000	7545.0000	8507.0000	9383.0000
10080.0000	14750.0000	19220.0000	15830.0000	9543.0000
-13.6400	1188.0000	1987.0000	3038.0000	3878.0000
4525.0000	4924.0000	5339.0000	6013.0000	6624.0000
7104.0000	10340.0000	13400.0000	11030.0000	6689.0000
-4.2260	921.5000	1537.0000	2347.0000	2996.0000
3496.0000	3804.0000	4126.0000	4644.0000	5114.0000
5484.0000	7942.0000	10240.0000	8462.0000	5213.0000
-.8404	.742.2000	1236.0000	1886.0000	2407.0000
2808.0000	3056.0000	3315.0000	3729.0000	4105.0000
4401.0000	6353.0000	8166.0000	6756.0000	4192.0000
4.7860	608.5000	1010.0000	1540.0000	1966.0000
2295.0000	2500.0000	2714.0000	3053.0000	3361.0000
3607.0000	5184.0000	6643.0000	5530.0000	3504.0000
8.1650	495.5000	820.1000	1248.0000	1595.0000
1862.0000	2030.0000	2205.0000	2481.0000	2731.0000
2933.0000	4196.0000	5359.0000	4484.0000	2895.0000
12.8200	399.7000	658.0000	999.7000	1280.0000
1496.0000	1633.0000	1778.0000	2000.0000	2203.0000
2372.0000	3372.0000	4289.0000	3629.0000	2422.0000
18.5100	316.0000	515.5000	781.2000	1003.0000
1176.0000	1288.0000	1407.0000	1585.0000	1749.0000
1892.0000	2666.0000	3377.0000	2913.0000	2048.0000
13.1800	215.1000	350.4000	530.2000	680.3000
796.4000	872.1000	951.6000	1070.0000	1180.0000
1274.0000	1785.0000	2248.0000	1935.0000	1363.0000
67.7400	215.8000	322.5000	478.1000	641.8000
776.1000	886.4000	1010.0000	1156.0000	1307.0000
1489.0000	1991.0000	2498.0000	2554.0000	2450.0000
-68.3600	4506.0000	7216.0000	10920.0000	13840.0000
15760.0000	16710.0000	17940.0000	20350.0000	22410.0000
22100.0000	30290.0000	37850.0000	28200.0000	15710.0000
-71.0600	4761.0000	7618.0000	11550.0000	14740.0000
16900.0000	18070.0000	19570.0000	22390.0000	24880.0000
24990.0000	34970.0000	44880.0000	34880.0000	20170.0000
-57.9700	3956.0000	6327.0000	9597.0000	12310.0000
14180.0000	15250.0000	16620.0000	19110.0000	21370.0000
21740.0000	30810.0000	40220.0000	32190.0000	19120.0000
-43.8200	3104.0000	4964.0000	7532.0000	9677.0000
11180.0000	12040.0000	13160.0000	15160.0000	17000.0000
17380.0000	24760.0000	32530.0000	26390.0000	15900.0000
-33.9100	2475.0000	3956.0000	6003.0000	7720.0000
8922.0000	9626.0000	10530.0000	12140.0000	13620.0000
13960.0000	19930.0000	26250.0000	21440.0000	13010.0000
-21.5000	1797.0000	2871.0000	4354.0000	5600.0000
6473.0000	6987.0000	7644.0000	8811.0000	9888.0000
10140.0000	14460.0000	19010.0000	15590.0000	9528.0000
-11.9700	1278.0000	2039.0000	3089.0000	3969.0000
4585.0000	4947.0000	5409.0000	6226.0000	6979.0000
7153.0000	10140.0000	13260.0000	10870.0000	6683.0000
-3.7350	989.4000	1576.0000	2384.0000	3064.0000
3540.0000	3820.0000	4178.0000	4805.0000	5382.0000

5520.0000	7790.0000	10140.0000	8341.0000	5204.0000
-.7693	796.2000	1267.0000	1916.0000	2461.0000
2843.0000	3069.0000	3356.0000	3857.0000	4318.0000
4429.0000	6232.0000	8091.0000	6662.0000	4185.0000
4.1520	651.2000	1034.0000	1562.0000	2009.0000
2322.0000	2508.0000	2745.0000	3154.0000	3530.0000
3627.0000	5086.0000	6581.0000	5452.0000	3493.0000
7.1100	529.0000	838.2000	1265.0000	1628.0000
1883.0000	2036.0000	2229.0000	2560.0000	2864.0000
2948.0000	4117.0000	5309.0000	4421.0000	2883.0000
11.1900	425.0000	671.0000	1012.0000	1304.0000
1510.0000	1635.0000	1794.0000	2059.0000	2305.0000
2380.0000	3307.0000	4247.0000	3575.0000	2406.0000
16.1600	333.6000	523.6000	788.2000	1019.0000
1183.0000	1287.0000	1416.0000	1625.0000	1821.0000
1894.0000	2612.0000	3340.0000	2867.0000	2027.0000
11.5100	226.9000	355.8000	535.0000	690.9000
801.5000	871.1000	957.6000	1098.0000	1228.0000
1275.0000	1750.0000	2225.0000	1906.0000	1350.0000
59.1900	211.8000	313.3000	465.8000	629.2000
758.1000	862.9000	986.6000	1142.0000	1300.0000
1454.0000	1929.0000	2433.0000	2477.0000	2373.0000
-58.8100	4508.0000	7124.0000	10810.0000	13820.0000
15630.0000	16610.0000	18150.0000	21260.0000	24050.0000
23370.0000	30970.0000	38120.0000	28420.0000	15780.0000
-61.0900	4755.0000	7506.0000	11400.0000	14660.0000
16700.0000	17900.0000	19720.0000	23250.0000	26510.0000
26240.0000	35480.0000	44810.0000	34840.0000	20050.0000
-49.8100	3946.0000	6226.0000	9460.0000	12220.0000
13990.0000	15070.0000	16700.0000	19770.0000	22650.0000
22720.0000	31100.0000	39930.0000	31970.0000	18870.0000
-37.6500	3095.0000	4882.0000	7419.0000	9601.0000
11010.0000	11890.0000	13210.0000	15660.0000	17980.0000
18120.0000	24940.0000	32210.0000	26140.0000	15640.0000
-29.1400	2467.0000	3890.0000	5912.0000	7656.0000
8789.0000	9500.0000	10560.0000	12530.0000	14400.0000
14550.0000	20050.0000	25970.0000	21210.0000	12780.0000
-18.4800	1791.0000	2822.0000	4287.0000	5552.0000
6375.0000	6894.0000	7665.0000	9088.0000	10440.0000
10560.0000	14540.0000	18810.0000	15420.0000	9354.0000
-10.2900	1273.0000	2004.0000	3041.0000	3935.0000
4516.0000	4882.0000	5424.0000	6421.0000	7367.0000
7446.0000	10200.0000	13130.0000	10760.0000	6567.0000
-3.2240	984.6000	1548.0000	2346.0000	3037.0000
3486.0000	3769.0000	4187.0000	4952.0000	5676.0000
5741.0000	7837.0000	10040.0000	8258.0000	5114.0000
-.6762	792.0000	1244.0000	1885.0000	2439.0000
2799.0000	3027.0000	3363.0000	3974.0000	4552.0000
4604.0000	6270.0000	8013.0000	6597.0000	4113.0000
3.5490	646.9000	1015.0000	1536.0000	1989.0000
2285.0000	2473.0000	2749.0000	3246.0000	3716.0000
3766.0000	5114.0000	6517.0000	5397.0000	3431.0000
6.0890	524.9000	821.9000	1244.0000	1611.0000
1852.0000	2006.0000	2231.0000	2632.0000	3011.0000
3057.0000	4138.0000	5257.0000	4376.0000	2830.0000
9.5890	420.7000	657.0000	993.2000	1289.0000
1484.0000	1610.0000	1793.0000	2113.0000	2416.0000
2462.0000	3320.0000	4204.0000	3536.0000	2359.0000
13.8600	328.5000	511.4000	772.2000	1005.0000
1161.0000	1265.0000	1412.0000	1662.0000	1900.0000

Figure C-2-Continued.

1950.0000	2617.0000	3302.0000	2830.0000	1983.0000
9.8730	223.7000	347.4000	524.1000	681.7000
786.5000	856.4000	954.9000	1122.0000	1282.0000
1313.0000	1754.0000	2202.0000	1884.0000	1323.0000
50.8000	199.9000	296.8000	445.1000	605.9000
729.0000	831.4000	958.7000	1125.0000	1296.0000
1437.0000	1887.0000	2366.0000	2403.0000	2286.0000
-49.6000	4972.0000	7549.0000	10900.0000	13470.0000
15150.0000	16130.0000	17920.0000	21510.0000	25000.0000
25020.0000	32570.0000	38700.0000	28950.0000	15790.0000
-51.4900	5228.0000	7925.0000	11460.0000	14260.0000
16160.0000	17340.0000	19410.0000	23400.0000	27380.0000
27890.0000	36990.0000	45100.0000	35140.0000	19860.0000
-41.9600	4329.0000	6557.0000	9486.0000	11870.0000
13510.0000	14580.0000	16400.0000	19840.0000	23300.0000
24010.0000	32230.0000	39940.0000	32010.0000	18570.0000
-31.7200	3392.0000	5136.0000	7434.0000	9320.0000
10630.0000	11490.0000	12950.0000	15690.0000	18450.0000
19110.0000	25770.0000	32140.0000	26100.0000	15340.0000
-24.5400	2702.0000	4090.0000	5921.0000	7430.0000
8480.0000	9177.0000	10350.0000	12550.0000	14760.0000
15320.0000	20700.0000	25880.0000	21150.0000	12520.0000
-15.5700	1961.0000	2966.0000	4292.0000	5387.0000
6150.0000	6659.0000	7513.0000	9099.0000	10700.0000
11120.0000	15000.0000	18740.0000	15360.0000	9161.0000
-8.6820	1393.0000	2105.0000	3044.0000	3819.0000
4357.0000	4716.0000	5317.0000	6429.0000	7552.0000
7836.0000	10530.0000	13090.0000	10730.0000	6437.0000
-2.7340	1075.0000	1624.0000	2348.0000	2946.0000
3363.0000	3641.0000	4105.0000	4957.0000	5815.0000
6036.0000	8080.0000	10010.0000	8238.0000	5012.0000
-.5884	864.3000	1305.0000	1885.0000	2366.0000
2701.0000	2925.0000	3296.0000	3977.0000	4662.0000
4839.0000	6464.0000	7991.0000	6582.0000	4032.0000
2.9660	704.5000	1063.0000	1535.0000	1929.0000
2204.0000	2389.0000	2693.0000	3246.0000	3802.0000
3952.0000	5266.0000	6498.0000	5382.0000	3361.0000
5.1050	570.4000	859.7000	1242.0000	1562.0000
1786.0000	1937.0000	2185.0000	2631.0000	3079.0000
3203.0000	4257.0000	5241.0000	4362.0000	2772.0000
8.0500	455.4000	685.5000	990.6000	1249.0000
1430.0000	1554.0000	1754.0000	2110.0000	2466.0000
2573.0000	3409.0000	4188.0000	3521.0000	2308.0000
11.6400	353.6000	531.1000	768.1000	972.4000
1118.0000	1220.0000	1379.0000	1655.0000	1933.0000
2028.0000	2678.0000	3284.0000	2811.0000	1936.0000
8.2950	240.4000	360.8000	521.4000	659.5000
757.5000	826.0000	933.4000	1119.0000	1304.0000
1366.0000	1796.0000	2192.0000	1874.0000	1292.0000
42.7100	198.6000	291.7000	428.7000	575.8000
692.4000	791.6000	920.8000	1094.0000	1275.0000
1427.0000	1863.0000	2306.0000	2333.0000	2199.0000
-40.7700	5522.0000	8112.0000	10950.0000	12840.0000
14460.0000	15510.0000	17360.0000	21040.0000	24630.0000
26340.0000	34710.0000	39280.0000	29590.0000	15980.0000
-42.2900	5781.0000	8475.0000	11470.0000	13570.0000
15390.0000	16630.0000	18740.0000	22810.0000	26850.0000
29140.0000	39000.0000	45350.0000	35550.0000	19900.0000
-34.4500	4774.0000	6990.0000	9473.0000	11280.0000
12860.0000	13960.0000	15810.0000	19290.0000	22790.0000

24960.0000	33740.0000	39920.0000	32180.0000	18480.0000
-26.0300	3737.0000	5469.0000	7417.0000	8654.0000
10110.0000	11000.0000	12480.0000	15240.0000	18030.0000
19820.0000	26900.0000	32040.0000	26150.0000	15210.0000
-20.1400	2975.0000	4352.0000	5905.0000	7057.0000
8063.0000	8779.0000	9970.0000	12180.0000	14420.0000
15880.0000	21570.0000	25770.0000	21160.0000	12390.0000
-12.7800	2157.0000	3154.0000	4279.0000	5117.0000
5848.0000	6370.0000	7234.0000	8835.0000	10450.0000
11510.0000	15620.0000	18650.0000	15370.0000	9066.0000
-7.1280	1531.0000	2237.0000	3034.0000	3627.0000
4144.0000	4512.0000	5121.0000	6245.0000	7376.0000
8113.0000	10960.0000	13040.0000	10740.0000	6375.0000
-2.2470	1181.0000	1725.0000	2339.0000	2799.0000
3198.0000	3484.0000	3953.0000	4814.0000	5680.0000
6245.0000	8411.0000	9974.0000	8246.0000	4962.0000
-.4861	.948.2000	1385.0000	1878.0000	2248.0000
2569.0000	2799.0000	3175.0000	3863.0000	4554.0000
5005.0000	6727.0000	7963.0000	6590.0000	3992.0000
2.4310	771.4000	1126.0000	1528.0000	1832.0000
2096.0000	2286.0000	2594.0000	3153.0000	3714.0000
4083.0000	5475.0000	6473.0000	5385.0000	3324.0000
4.1870	623.4000	909.9000	1236.0000	1483.0000
1698.0000	1853.0000	2104.0000	2554.0000	3006.0000
3306.0000	4422.0000	5220.0000	4363.0000	2739.0000
6.6040	496.1000	723.7000	984.0000	1185.0000
1359.0000	1487.0000	1689.0000	2047.0000	2407.0000
2650.0000	3534.0000	4169.0000	3517.0000	2276.0000
9.5520	382.9000	558.2000	761.2000	922.2000
1062.0000	1165.0000	1327.0000	1605.0000	1885.0000
2081.0000	2766.0000	3263.0000	2801.0000	1902.0000
6.8070	260.1000	379.1000	516.6000	625.6000
719.7000	789.6000	897.9000	1085.0000	1272.0000
1402.0000	1856.0000	2180.0000	1869.0000	1272.0000
35.0500	199.1000	289.5000	411.5000	539.7000
651.5000	748.7000	875.7000	1047.0000	1226.0000
1409.0000	1849.0000	2245.0000	2266.0000	2116.0000
-32.4400	5214.0000	7676.0000	10160.0000	11880.0000
13740.0000	15040.0000	16930.0000	20170.0000	23270.0000
26730.0000	36150.0000	39370.0000	29890.0000	16220.0000
-33.6300	5451.0000	8008.0000	10630.0000	12550.0000
14600.0000	16080.0000	18230.0000	21810.0000	25320.0000
29380.0000	40250.0000	45080.0000	35580.0000	20000.0000
-27.3700	4497.0000	6597.0000	8781.0000	10420.0000
12170.0000	13470.0000	15340.0000	18410.0000	21450.0000
25060.0000	34600.0000	39460.0000	32010.0000	18450.0000
-20.6800	3518.0000	5159.0000	6873.0000	8179.0000
9567.0000	10610.0000	12100.0000	14530.0000	16960.0000
19870.0000	27510.0000	31600.0000	25940.0000	15140.0000
-16.0000	2801.0000	4106.0000	5472.0000	6518.0000
7630.0000	8466.0000	9663.0000	11610.0000	13560.0000
15900.0000	22040.0000	25390.0000	20970.0000	12320.0000
-10.1400	2030.0000	2975.0000	3965.0000	4727.0000
5534.0000	6142.0000	7011.0000	8423.0000	9831.0000
11530.0000	15950.0000	18370.0000	15220.0000	9006.0000
-5.6520	1441.0000	2110.0000	2812.0000	3352.0000
3922.0000	4352.0000	4964.0000	5956.0000	6943.0000
8126.0000	11190.0000	12850.0000	10650.0000	6336.0000
-1.7680	1110.0000	1626.0000	2168.0000	2586.0000
3027.0000	3360.0000	3832.0000	4593.0000	5349.0000

Figure C-2-Continued.

6253.0000	8586.0000	9836.0000	8175.0000	4929.0000	2021.0000	2777.0000	3139.0000	2715.0000	1851.0000
-.3679	891.7000	1305.0000	1740.0000	2077.0000	4.1920	170.9000	266.2000	390.8000	521.2000
2432.0000	2699.0000	3077.0000	3686.0000	4290.0000	643.3000	743.2000	855.1000	989.3000	1118.0000
5012.0000	6866.0000	7855.0000	6535.0000	3965.0000	1363.0000	1866.0000	2101.0000	1815.0000	1240.0000
1.9550	724.9000	1061.0000	1416.0000	1693.0000	21.5700	134.5000	208.5000	317.6000	449.7000
1984.0000	2203.0000	2513.0000	3008.0000	3499.0000	570.5000	678.4000	801.5000	939.2000	1082.0000
4086.0000	5584.0000	6384.0000	5338.0000	3297.0000	1316.0000	1766.0000	2095.0000	2114.0000	1959.0000
3.3520	585.6000	857.0000	1145.0000	1371.0000	-35.7100	1212.0000	2569.0000	5561.0000	9422.0000
1607.0000	1786.0000	2038.0000	2437.0000	2834.0000	12470.0000	15030.0000	17320.0000	19150.0000	20500.0000
3307.0000	4508.0000	5149.0000	4324.0000	2714.0000	25840.0000	36000.0000	38260.0000	29380.0000	16550.0000
5.2780	465.4000	681.1000	911.4000	1095.0000	-37.2700	1279.0000	2711.0000	5868.0000	9951.0000
1286.0000	1432.0000	1635.0000	1953.0000	2270.0000	13190.0000	15960.0000	18480.0000	20570.0000	22210.0000
2648.0000	3598.0000	4110.0000	3482.0000	2250.0000	28150.0000	39540.0000	43190.0000	34410.0000	20040.0000
7.6280	358.4000	524.6000	704.5000	852.2000	-30.5900	1061.0000	2251.0000	4871.0000	8267.0000
1004.0000	1121.0000	1283.0000	1531.0000	1778.0000	10970.0000	13300.0000	15460.0000	17280.0000	18760.0000
2075.0000	2808.0000	3214.0000	2768.0000	1874.0000	23860.0000	33690.0000	37460.0000	30620.0000	18250.0000
5.4360	243.5000	356.2000	478.2000	578.3000	-23.5200	832.7000	1766.0000	3821.0000	6487.0000
680.7000	759.8000	868.5000	1035.0000	1201.0000	8616.0000	10450.0000	12160.0000	13620.0000	14820.0000
1399.0000	1885.0000	2149.0000	1848.0000	1254.0000	18870.0000	26700.0000	29890.0000	24700.0000	14890.0000
27.9700	181.1000	266.2000	377.0000	497.0000	-18.4600	663.9000	1408.0000	3045.0000	5170.0000
610.2000	709.8000	834.1000	991.8000	1156.0000	6869.0000	8335.0000	9705.0000	10880.0000	11850.0000
1370.0000	1820.0000	2174.0000	2193.0000	2036.0000	15090.0000	21350.0000	23980.0000	19920.0000	12080.0000
-25.0400	3579.0000	5612.0000	8174.0000	10680.0000	-12.5500	483.0000	1023.0000	2211.0000	3751.0000
13050.0000	14880.0000	16890.0000	19380.0000	21630.0000	4981.0000	6043.0000	7036.0000	7887.0000	8592.0000
26330.0000	36360.0000	39040.0000	29870.0000	16530.0000	10930.0000	15440.0000	17350.0000	14460.0000	8825.0000
-25.9400	3757.0000	5883.0000	8583.0000	11280.0000	-8.0220	344.5000	728.2000	1571.0000	2662.0000
13830.0000	15860.0000	18110.0000	20900.0000	23490.0000	3532.0000	4282.0000	4982.0000	5580.0000	6075.0000
28800.0000	40200.0000	44350.0000	35260.0000	20180.0000	7714.0000	10850.0000	12150.0000	10140.0000	6216.0000
-21.1100	3107.0000	4862.0000	7102.0000	9367.0000	-4.6930	268.1000	564.6000	1214.0000	2055.0000
11520.0000	13260.0000	15200.0000	17600.0000	19880.0000	2726.0000	3303.0000	3842.0000	4302.0000	4684.0000
24490.0000	34390.0000	38620.0000	31540.0000	18490.0000	5937.0000	8326.0000	9311.0000	7786.0000	4832.0000
-15.9500	2434.0000	3807.0000	5564.0000	7350.0000	-3.1630	216.4000	454.7000	976.7000	1652.0000
9053.0000	10430.0000	11970.0000	13890.0000	15720.0000	2190.0000	2652.0000	3084.0000	3453.0000	3759.0000
19390.0000	27290.0000	30870.0000	25500.0000	15130.0000	4760.0000	6661.0000	7441.0000	6228.0000	3887.0000
-12.3400	1938.0000	3032.0000	4431.0000	5857.0000	-1.2730	178.1000	372.5000	797.5000	1347.0000
7218.0000	8319.0000	9560.0000	11090.0000	12560.0000	1785.0000	2163.0000	2515.0000	2817.0000	3068.0000
15510.0000	21840.0000	24780.0000	20590.0000	12290.0000	3879.0000	5416.0000	6049.0000	5087.0000	3225.0000
-7.8230	1406.0000	2198.0000	3213.0000	4248.0000	-.0060	145.6000	303.1000	646.8000	1092.0000
5235.0000	6034.0000	6934.0000	8046.0000	9111.0000	1446.0000	1751.0000	2037.0000	2282.0000	2486.0000
11240.0000	15800.0000	17930.0000	14940.0000	8977.0000	3139.0000	4371.0000	4880.0000	4121.0000	2650.0000
-4.3590	998.6000	1561.0000	2280.0000	3014.0000	1.5020	118.2000	244.2000	518.1000	873.0000
3711.0000	4275.0000	4910.0000	5692.0000	6438.0000	1156.0000	1400.0000	1630.0000	1827.0000	1993.0000
7928.0000	11100.0000	12550.0000	10470.0000	6319.0000	2511.0000	3485.0000	3895.0000	3317.0000	2189.0000
-1.3640	770.7000	1204.0000	1759.0000	2326.0000	3.2120	94.4700	192.6000	404.7000	680.3000
2864.0000	3300.0000	3789.0000	4390.0000	4963.0000	900.6000	1091.0000	1272.0000	1429.0000	1563.0000
6102.0000	8512.0000	9611.0000	8035.0000	4913.0000	1964.0000	2714.0000	3042.0000	2630.0000	1811.0000
-.2849	619.2000	967.0000	1413.0000	1869.0000	2.3290	64.4400	131.1000	275.1000	461.9000
2301.0000	2650.0000	3042.0000	3524.0000	3982.0000	611.0000	739.8000	861.5000	966.8000	1057.0000
4891.0000	6808.0000	7678.0000	6425.0000	3952.0000	1325.0000	1824.0000	2038.0000	1760.0000	1214.0000
1.5060	504.2000	787.1000	1151.0000	1524.0000	15.5400	70.8000	127.7000	244.0000	402.1000
1877.0000	2162.0000	2483.0000	2875.0000	3249.0000	534.2000	654.6000	780.1000	899.9000	1019.0000
3987.0000	5535.0000	6241.0000	5247.0000	3282.0000	1261.0000	1701.0000	2011.0000	2026.0000	1880.0000
2.5840	407.8000	636.4000	931.1000	1234.0000	-13.2200	-689.7000	113.0000	3274.0000	8340.0000
1520.0000	1752.0000	2013.0000	2330.0000	2632.0000	11920.0000	15210.0000	17910.0000	19400.0000	20350.0000
3226.0000	4467.0000	5034.0000	4249.0000	2698.0000	26420.0000	36130.0000	37550.0000	28850.0000	16460.0000
4.0690	325.0000	506.9000	742.5000	986.4000	-13.6900	-726.2000	120.4000	3465.0000	8807.0000
1216.0000	1403.0000	1613.0000	1867.0000	2110.0000	12590.0000	16080.0000	19000.0000	20730.0000	21950.0000
2582.0000	3563.0000	4017.0000	3421.0000	2232.0000	28580.0000	39420.0000	42110.0000	33530.0000	19750.0000
5.8810	251.4000	391.9000	575.5000	767.9000	-11.1400	-601.6000	101.0000	2882.0000	7316.0000
948.5000	1096.0000	1263.0000	1462.0000	1654.0000	10460.0000	13360.0000	15840.0000	17360.0000	18490.0000

Figure C-2-Continued.

24120.0000	33440.0000	36370.0000	29690.0000	17890.0000
-8.4170	-470.5000	80.7400	2263.0000	5740.0000
8209.0000	10490.0000	12440.0000	13670.0000	14590.0000
19050.0000	26450.0000	28970.0000	23900.0000	14560.0000
-6.5150	-374.2000	65.2600	1805.0000	4575.0000
6542.0000	8359.0000	9922.0000	10910.0000	11660.0000
15220.0000	21130.0000	23220.0000	19260.0000	11800.0000
-4.1440	-269.3000	50.1400	1312.0000	3320.0000
4744.0000	6059.0000	7190.0000	7904.0000	8451.0000
11020.0000	15280.0000	16800.0000	13980.0000	8614.0000
-2.3250	-189.0000	38.5700	934.6000	2357.0000
3364.0000	4292.0000	5089.0000	5592.0000	5976.0000
7776.0000	10740.0000	11780.0000	9807.0000	6072.0000
-.7604	-142.0000	34.6700	725.6000	1820.0000
2596.0000	3309.0000	3923.0000	4310.0000	4607.0000
5983.0000	8242.0000	9030.0000	7537.0000	4720.0000
-.1916	-112.6000	29.8500	584.8000	1463.0000
2085.0000	2657.0000	3148.0000	3459.0000	3697.0000
4796.0000	6595.0000	7218.0000	6031.0000	3797.0000
.7427	-88.2600	28.5700	480.0000	1194.0000
1700.0000	2165.0000	2565.0000	2820.0000	3016.0000
3906.0000	5360.0000	5869.0000	4927.0000	3149.0000
1.3070	-68.7400	26.4600	391.4000	967.6000
1376.0000	1752.0000	2075.0000	2283.0000	2443.0000
3159.0000	4325.0000	4736.0000	3992.0000	2586.0000
2.0810	-50.8700	26.0000	316.4000	774.2000
1100.0000	1399.0000	1658.0000	1825.0000	1957.0000
2524.0000	3447.0000	3779.0000	3212.0000	2134.0000
3.0240	-34.0300	26.8100	251.1000	603.8000
855.6000	1087.0000	1290.0000	1424.0000	1532.0000
1969.0000	2680.0000	2950.0000	2546.0000	1762.0000
2.1560	-22.7600	18.6900	171.0000	410.1000
580.6000	737.1000	873.6000	963.8000	1036.0000
1329.0000	1803.0000	1978.0000	1706.0000	1182.0000
11.1500	17.7200	59.4500	177.2000	359.2000
499.7000	632.2000	762.7000	871.7000	978.5000
1229.0000	1649.0000	1930.0000	1941.0000	1799.0000
-9.0670	-1391.0000	-1002.0000	2232.0000	7609.0000
11430.0000	15140.0000	18190.0000	19900.0000	21130.0000
28370.0000	37520.0000	37370.0000	28840.0000	16620.0000
-9.3930	-1462.0000	-1056.0000	2362.0000	8029.0000
12050.0000	15950.0000	19210.0000	21150.0000	22650.0000
30410.0000	40560.0000	41610.0000	33280.0000	19780.0000
-7.6470	-1210.0000	-875.5000	1966.0000	6666.0000
9996.0000	13220.0000	15960.0000	17650.0000	19010.0000
25500.0000	34180.0000	35770.0000	29320.0000	17820.0000
-5.7910	-947.0000	-684.9000	1544.0000	5229.0000
7839.0000	10370.0000	12520.0000	13870.0000	14970.0000
20080.0000	26960.0000	28440.0000	23550.0000	14460.0000
-4.4890	-753.6000	-544.8000	1232.0000	4167.0000
6246.0000	8260.0000	9979.0000	11060.0000	11950.0000
16030.0000	21520.0000	22780.0000	18960.0000	11710.0000
-2.8790	-544.5000	-392.3000	896.6000	3024.0000
4529.0000	5985.0000	7229.0000	8015.0000	8661.0000
11600.0000	15550.0000	16480.0000	13760.0000	8543.0000
-1.6440	-384.4000	-275.4000	639.6000	2147.0000
3212.0000	4240.0000	5117.0000	5669.0000	6123.0000
8181.0000	10930.0000	11560.0000	9660.0000	6025.0000
-.5978	-292.6000	-207.1000	498.3000	1659.0000
2478.0000	3268.0000	3942.0000	4368.0000	4718.0000

6290.0000	8387.0000	8864.0000	7425.0000	4681.0000
-.2083	-233.5000	-164.2000	402.3000	1333.0000
1990.0000	2623.0000	3163.0000	3505.0000	3785.0000
5040.0000	6710.0000	7087.0000	5943.0000	3766.0000
.4135	-186.6000	-128.9000	331.7000	1088.0000
1622.0000	2136.0000	2575.0000	2855.0000	3085.0000
4101.0000	5451.0000	5762.0000	4853.0000	3119.0000
.7928	-148.1000	-100.6000	271.6000	881.6000
1313.0000	1728.0000	2083.0000	2309.0000	2497.0000
3313.0000	4396.0000	4649.0000	3931.0000	2560.0000
1.3060	-113.9000	-74.6300	221.2000	705.3000
1048.0000	1378.0000	1661.0000	1844.0000	1996.0000
2642.0000	3499.0000	3709.0000	3161.0000	2108.0000
1.9280	-82.4900	-50.2600	177.7000	549.8000
814.5000	1069.0000	1289.0000	1434.0000	1558.0000
2053.0000	2715.0000	2892.0000	2502.0000	1734.0000
1.3760	-55.7000	-33.6400	121.2000	373.5000
552.8000	724.8000	873.5000	970.9000	1054.0000
1386.0000	1827.0000	1941.0000	1677.0000	1165.0000
7.2180	-6.0650	23.5100	139.8000	325.1000
467.6000	605.6000	739.7000	850.0000	959.2000
1226.0000	1622.0000	1863.0000	1872.0000	1730.0000
-5.6010	-1056.0000	-612.1000	2321.0000	7192.0000
10920.0000	14590.0000	17930.0000	20320.0000	22390.0000
31390.0000	40180.0000	37580.0000	29380.0000	17110.0000
-5.8070	-1110.0000	-644.7000	2453.0000	7577.0000
11480.0000	15330.0000	18870.0000	21480.0000	23820.0000
33220.0000	42900.0000	41540.0000	33620.0000	20210.0000
-4.7320	-918.3000	-534.2000	2039.0000	6285.0000
9516.0000	12690.0000	15640.0000	17860.0000	19890.0000
27620.0000	35850.0000	35530.0000	29460.0000	18100.0000
-3.5910	-718.6000	-417.6000	1600.0000	4928.0000
7460.0000	9947.0000	12260.0000	14020.0000	15630.0000
21680.0000	28180.0000	28190.0000	23610.0000	14660.0000
-2.7890	-571.8000	-332.0000	1276.0000	3927.0000
5942.0000	7922.0000	9764.0000	11170.0000	12470.0000
17270.0000	22460.0000	22560.0000	18990.0000	11850.0000
-1.8040	-413.2000	-238.5000	928.1000	2849.0000
4308.0000	5739.0000	7072.0000	8089.0000	9029.0000
12480.0000	16220.0000	16320.0000	13770.0000	8645.0000
-1.0490	-291.7000	-167.0000	661.4000	2023.0000
3055.0000	4066.0000	5006.0000	5722.0000	6382.0000
8802.0000	11400.0000	11450.0000	9674.0000	6097.0000
-.4215	-222.1000	-124.6000	514.0000	1562.0000
2357.0000	3134.0000	3856.0000	4406.0000	4914.0000
6762.0000	8739.0000	8782.0000	7435.0000	4732.0000
-.1812	-177.2000	-98.4600	414.5000	1256.0000
1893.0000	2516.0000	3094.0000	3535.0000	3941.0000
5416.0000	6991.0000	7023.0000	5951.0000	3806.0000
.1902	-141.6000	-76.5000	340.7000	1024.0000
1542.0000	2048.0000	2518.0000	2877.0000	3209.0000
4401.0000	5674.0000	5708.0000	4857.0000	3147.0000
.4192	-112.4000	-59.0100	278.1000	829.5000
1248.0000	1656.0000	2036.0000	2326.0000	2594.0000
3551.0000	4573.0000	4605.0000	3932.0000	2579.0000
.7248	-86.4200	-42.7900	225.2000	663.1000
995.6000	1320.0000	1622.0000	1855.0000	2070.0000
2826.0000	3635.0000	3672.0000	3159.0000	2118.0000
1.0920	-62.5800	-27.3500	179.3000	516.1000
772.7000	1023.0000	1257.0000	1440.0000	1609.0000

Figure C-2-Continued.

2187.0000	2812.0000	2859.0000	2494.0000	1734.0000
.7802	-42.2500	-18.1900	122.2000	350.6000
524.4000	693.6000	852.0000	974.6000	1089.0000
1477.0000	1893.0000	1920.0000	1673.0000	1165.0000
4.1680	-4.4680	24.2100	129.9000	299.3000
436.2000	570.3000	706.8000	827.6000	950.6000
1242.0000	1618.0000	1808.0000	1819.0000	1674.0000
-2.6700	-280.1000	421.9000	3103.0000	6990.0000
10400.0000	13760.0000	17180.0000	20340.0000	23390.0000
34140.0000	42900.0000	38170.0000	30310.0000	17830.0000
-2.7670	-294.5000	445.2000	3269.0000	7350.0000
10930.0000	14440.0000	18050.0000	21410.0000	24700.0000
35680.0000	45210.0000	41860.0000	34400.0000	20890.0000
-2.2540	-243.7000	369.8000	2711.0000	6088.0000
9045.0000	11950.0000	14930.0000	17740.0000	20520.0000
29400.0000	37440.0000	35620.0000	29970.0000	18620.0000
-1.7100	-190.4000	290.5000	2126.0000	4771.0000
7087.0000	9358.0000	11700.0000	13910.0000	16110.0000
23000.0000	29340.0000	28200.0000	23960.0000	15050.0000
-1.3280	-151.4000	231.9000	1694.0000	3801.0000
5644.0000	7452.0000	9319.0000	11080.0000	12830.0000
18300.0000	23350.0000	22550.0000	19250.0000	12150.0000
-.8594	-108.9000	169.6000	1230.0000	2757.0000
4092.0000	5399.0000	6749.0000	8021.0000	9287.0000
13210.0000	16840.0000	16300.0000	13960.0000	8855.0000
-.4997	-76.4000	121.8000	874.8000	1957.0000
2902.0000	3826.0000	4778.0000	5674.0000	6564.0000
9311.0000	11830.0000	11450.0000	9805.0000	6245.0000
-.2006	-57.2900	96.2800	676.8000	1511.0000
2238.0000	2949.0000	3680.0000	4368.0000	5051.0000
7148.0000	9069.0000	8777.0000	7534.0000	4842.0000
-.0861	-45.3600	78.2800	544.5000	1214.0000
1798.0000	2367.0000	2953.0000	3504.0000	4050.0000
5724.0000	7254.0000	7020.0000	6030.0000	3892.0000
.0909	-35.4700	65.6900	444.8000	989.3000
1464.0000	1927.0000	2403.0000	2851.0000	3295.0000
4647.0000	5884.0000	5704.0000	4917.0000	3212.0000
.2000	-27.5400	54.6700	361.0000	800.9000
1184.0000	1558.0000	1942.0000	2304.0000	2662.0000
3746.0000	4739.0000	4600.0000	3979.0000	2628.0000
.3457	-20.2500	45.8100	289.4000	639.4000
944.2000	1241.0000	1547.0000	1835.0000	2121.0000
2976.0000	3762.0000	3665.0000	3191.0000	2151.0000
.5208	-13.3500	38.4900	226.2000	496.4000
731.9000	961.3000	1198.0000	1422.0000	1644.0000
2296.0000	2903.0000	2850.0000	2512.0000	1752.0000
.3720	-8.9200	26.3800	153.9000	337.3000
496.8000	652.1000	812.2000	962.8000	1112.0000
1550.0000	1955.0000	1915.0000	1686.0000	1178.0000
1.9870	8.4770	41.1200	137.2000	279.5000
406.3000	530.7000	665.6000	798.4000	937.2000
1252.0000	1615.0000	1763.0000	1778.0000	1629.0000
-.8090	347.6000	1347.0000	3784.0000	6875.0000
9972.0000	12970.0000	16360.0000	19870.0000	23550.0000
35320.0000	44310.0000	38670.0000	31250.0000	18680.0000
-.8378	365.8000	1417.0000	3971.0000	7214.0000
10460.0000	13590.0000	17160.0000	20850.0000	24750.0000
36570.0000	46230.0000	42100.0000	35180.0000	21720.0000
-.6820	303.1000	1173.0000	3285.0000	5966.0000
8644.0000	11230.0000	14180.0000	17250.0000	20490.0000

29960.0000	38030.0000	35640.0000	30480.0000	19260.0000
-.5167	237.6000	919.5000	2573.0000	4673.0000
6769.0000	8798.0000	11110.0000	13510.0000	16060.0000
23380.0000	29720.0000	28160.0000	24320.0000	15520.0000
-.4008	189.4000	732.6000	2049.0000	3721.0000
5390.0000	7005.0000	8844.0000	10760.0000	12790.0000
18580.0000	23620.0000	22500.0000	19510.0000	12520.0000
-.2579	137.7000	531.8000	1486.0000	2699.0000
3907.0000	5075.0000	6405.0000	7788.0000	9253.0000
13410.0000	17030.0000	16260.0000	14140.0000	9121.0000
-.1483	98.2000	378.2000	1056.0000	1915.0000
2771.0000	3597.0000	4536.0000	5509.0000	6539.0000
9448.0000	11970.0000	11420.0000	9937.0000	6432.0000
-.0561	76.3200	292.4000	814.7000	1478.0000
2137.0000	2772.0000	3494.0000	4241.0000	5031.0000
7251.0000	9171.0000	8757.0000	7633.0000	4981.0000
-.0214	61.5500	235.2000	654.7000	1187.0000
1716.0000	2226.0000	2804.0000	3402.0000	4034.0000
5806.0000	7335.0000	7004.0000	6109.0000	4002.0000
.0334	50.5600	192.0000	533.1000	966.7000
1397.0000	1811.0000	2281.0000	2767.0000	3280.0000
4711.0000	5947.0000	5689.0000	4979.0000	3297.0000
.0669	41.2600	155.6000	431.2000	782.0000
1129.0000	1464.0000	1844.0000	2236.0000	2649.0000
3797.0000	4789.0000	4588.0000	4026.0000	2693.0000
.1121	33.3900	124.5000	343.7000	623.3000
900.0000	1166.0000	1468.0000	1780.0000	2109.0000
3013.0000	3798.0000	3652.0000	3225.0000	2198.0000
.1666	26.5200	96.9800	265.9000	482.7000
696.7000	902.8000	1136.0000	1378.0000	1632.0000
2321.0000	2926.0000	2836.0000	2532.0000	1780.0000
.1190	18.0900	65.9900	180.7000	327.9000
472.9000	612.5000	770.3000	933.0000	1104.0000
1567.0000	1971.0000	1907.0000	1700.0000	1197.0000
.6281	18.8100	56.1600	142.7000	262.9000
379.5000	493.5000	624.7000	761.4000	908.9000
1233.0000	1590.0000	1719.0000	1741.0000	1590.0000
-.0486	566.8000	1702.0000	4063.0000	6802.0000
9699.0000	12490.0000	15690.0000	19090.0000	22660.0000
34220.0000	43590.0000	38920.0000	31910.0000	19190.0000
-.0505	595.5000	1786.0000	4251.0000	7120.0000
10150.0000	13070.0000	16420.0000	19990.0000	23770.0000
35330.0000	45280.0000	42080.0000	35670.0000	22170.0000
-.0411	492.9000	1477.0000	3509.0000	5880.0000
8377.0000	10790.0000	13560.0000	16510.0000	19650.0000
28890.0000	37130.0000	35470.0000	30760.0000	19570.0000
-.0313	386.1000	1156.0000	2746.0000	4603.0000
6557.0000	8444.0000	10620.0000	12930.0000	15390.0000
22540.0000	28990.0000	27980.0000	24490.0000	15750.0000
-.0243	307.5000	920.5000	2185.0000	3664.0000
5219.0000	6722.0000	8452.0000	10290.0000	12250.0000
17900.0000	23030.0000	22330.0000	19640.0000	12690.0000
-.0159	223.1000	667.6000	1584.0000	2656.0000
3782.0000	4869.0000	6121.0000	7450.0000	8866.0000
12920.0000	16600.0000	16130.0000	14220.0000	9239.0000
-.0094	158.5000	474.1000	1125.0000	1885.0000
2683.0000	3451.0000	4335.0000	5272.0000	6268.0000
9109.0000	11670.0000	11340.0000	9998.0000	6516.0000
-.0041	122.3000	365.5000	866.9000	1454.0000
2068.0000	2660.0000	3339.0000	4059.0000	4823.0000

Figure C-2-Continued.

6992.0000	8945.0000	8694.0000	7679.0000	5042.0000
-.0020	98.2600	293.6000	696.1000	1167.0000
1660.0000	2135.0000	2680.0000	3256.0000	3868.0000
5599.0000	7155.0000	6954.0000	6146.0000	4050.0000
.0011	79.9400	238.7000	565.9000	949.8000
1351.0000	1737.0000	2180.0000	2648.0000	3145.0000
4543.0000	5802.0000	5648.0000	5006.0000	3333.0000
.0031	64.6200	192.8000	457.1000	767.8000
1092.0000	1404.0000	1761.0000	2139.0000	2539.0000
3662.0000	4672.0000	4554.0000	4046.0000	2719.0000
.0056	51.4100	153.2000	363.2000	611.1000
869.2000	1118.0000	1402.0000	1703.0000	2021.0000
2906.0000	3705.0000	3623.0000	3237.0000	2214.0000
.0087	39.6600	117.9000	279.5000	472.0000
671.7000	863.9000	1084.0000	1317.0000	1563.0000
2237.0000	2853.0000	2810.0000	2536.0000	1787.0000
.0062	26.9600	80.1000	189.9000	320.6000
456.0000	586.1000	735.2000	892.1000	1058.0000
1511.0000	1923.0000	1890.0000	1704.0000	1202.0000
.0338	20.3100	58.5700	139.9000	248.4000
357.5000	464.5000	588.7000	720.1000	862.4000
1178.0000	1534.0000	1674.0000	1702.0000	1547.0000
-.2215	481.0000	1600.0000	3942.0000	6681.0000
9590.0000	12430.0000	15420.0000	18290.0000	21050.0000
31320.0000	41250.0000	39120.0000	32260.0000	19410.0000
-.2298	505.2000	1676.0000	4117.0000	6979.0000
10010.0000	12960.0000	16090.0000	19130.0000	22080.0000
32440.0000	42840.0000	42030.0000	35840.0000	22300.0000
-.1874	418.0000	1385.0000	3394.0000	5755.0000
8246.0000	10680.0000	13260.0000	15780.0000	18260.0000
26580.0000	35140.0000	35270.0000	30770.0000	19610.0000
-.1425	327.3000	1084.0000	2655.0000	4502.0000
6450.0000	8350.0000	10380.0000	12350.0000	14300.0000
20750.0000	27440.0000	27780.0000	24460.0000	15750.0000
-.1108	260.7000	862.8000	2113.0000	3583.0000
5133.0000	6644.0000	8257.0000	9831.0000	11390.0000
16490.0000	21810.0000	22160.0000	19590.0000	12680.0000
-.0723	189.0000	625.5000	1531.0000	2597.0000
3718.0000	4812.0000	5979.0000	7116.0000	8242.0000
11910.0000	15720.0000	16000.0000	14190.0000	9227.0000
-.0428	134.2000	444.1000	1087.0000	1842.0000
2637.0000	3410.0000	4234.0000	5036.0000	5829.0000
8401.0000	11060.0000	11250.0000	9975.0000	6509.0000
-.0186	103.4000	342.1000	837.0000	1420.0000
2032.0000	2627.0000	3261.0000	3878.0000	4487.0000
6452.0000	8481.0000	8626.0000	7661.0000	5035.0000
-.0091	83.0200	274.6000	672.0000	1140.0000
1631.0000	2109.0000	2617.0000	3111.0000	3599.0000
5169.0000	6786.0000	6901.0000	6132.0000	4044.0000
.0051	67.4100	223.0000	545.8000	927.0000
1326.0000	1715.0000	2128.0000	2530.0000	2926.0000
4196.0000	5503.0000	5603.0000	4993.0000	3325.0000
.0139	54.3900	179.9000	440.5000	748.9000
1071.0000	1385.0000	1719.0000	2043.0000	2364.0000
3383.0000	4433.0000	4517.0000	4035.0000	2711.0000
.0256	43.1200	142.6000	349.4000	595.3000
852.0000	1102.0000	1367.0000	1626.0000	1882.0000
2685.0000	3516.0000	3593.0000	3225.0000	2204.0000
.0395	33.0500	109.3000	268.2000	458.7000
657.1000	850.0000	1056.0000	1257.0000	1456.0000

2069.0000	2708.0000	2783.0000	2523.0000	1774.0000
.0282	22.4600	74.2500	182.2000	311.6000
446.0000	576.7000	716.0000	851.6000	985.9000
1399.0000	1826.0000	1873.0000	1696.0000	1194.0000
.1539	15.5100	51.3100	129.2000	234.0000
340.4000	445.6000	562.6000	680.7000	804.3000
1096.0000	1456.0000	1631.0000	1660.0000	1501.0000
-1.2740	321.1000	1332.0000	3620.0000	6477.0000
9510.0000	12580.0000	15480.0000	17620.0000	19390.0000
27900.0000	38510.0000	39440.0000	32740.0000	19600.0000
-1.3210	337.3000	1396.0000	3777.0000	6754.0000
9896.0000	13070.0000	16090.0000	18400.0000	20360.0000
29050.0000	40060.0000	42120.0000	36150.0000	22400.0000
-1.0770	279.1000	1153.0000	3112.0000	5562.0000
8140.0000	10740.0000	13230.0000	15160.0000	16850.0000
23890.0000	32910.0000	35200.0000	30910.0000	19630.0000
-.8191	218.5000	902.4000	2434.0000	4349.0000
6362.0000	8392.0000	10340.0000	11860.0000	13200.0000
18680.0000	25710.0000	27680.0000	24530.0000	15740.0000
-.6372	174.0000	718.3000	1936.0000	3461.0000
5061.0000	6674.0000	8225.0000	9441.0000	10510.0000
14850.0000	20440.0000	22060.0000	19630.0000	12670.0000
-.4157	126.2000	520.7000	1403.0000	2508.0000
3666.0000	4832.0000	5953.0000	6834.0000	7610.0000
10730.0000	14740.0000	15930.0000	14210.0000	9214.0000
-.2459	89.5500	369.6000	995.7000	1779.0000
2599.0000	3424.0000	4216.0000	4837.0000	5384.0000
7578.0000	10380.0000	11200.0000	9996.0000	6501.0000
-.1071	68.9400	284.6000	766.8000	1371.0000
2002.0000	2636.0000	3246.0000	3724.0000	4146.0000
5824.0000	7962.0000	8588.0000	7676.0000	5027.0000
-.0525	55.3300	228.4000	615.5000	1100.0000
1607.0000	2116.0000	2604.0000	2988.0000	3326.0000
4668.0000	6373.0000	6871.0000	6144.0000	4037.0000
.0292	44.8800	185.3000	499.7000	894.1000
1306.0000	1719.0000	2117.0000	2429.0000	2705.0000
3791.0000	5170.0000	5578.0000	5000.0000	3317.0000
.0801	36.1800	149.4000	403.0000	721.9000
1054.0000	1388.0000	1709.0000	1962.0000	2186.0000
3058.0000	4166.0000	4496.0000	4039.0000	2703.0000
.1471	28.6300	118.3000	319.5000	573.3000
837.6000	1103.0000	1358.0000	1561.0000	1741.0000
2430.0000	3306.0000	3574.0000	3226.0000	2194.0000
.2269	21.8700	90.4900	244.8000	440.9000
644.7000	849.1000	1047.0000	1206.0000	1348.0000
1875.0000	2548.0000	2765.0000	2519.0000	1762.0000
.1623	14.8600	61.4700	166.3000	299.4000
437.7000	576.1000	710.1000	817.1000	912.8000
1268.0000	1719.0000	1862.0000	1695.0000	1186.0000
.8848	9.7700	41.1800	115.0000	219.0000
325.3000	432.7000	544.9000	646.2000	747.6000
1006.0000	1374.0000	1595.0000	1625.0000	1459.0000
-3.0520	146.8000	1079.0000	3229.0000	6100.0000
9337.0000	12610.0000	15550.0000	17140.0000	18220.0000
25130.0000	36360.0000	40250.0000	33550.0000	20030.0000
-3.1660	154.2000	1130.0000	3368.0000	6355.0000
9693.0000	13060.0000	16100.0000	17860.0000	19130.0000
26260.0000	37850.0000	42680.0000	36800.0000	22770.0000
-2.5820	127.6000	933.5000	2775.0000	5230.0000
7960.0000	10700.0000	13210.0000	14700.0000	15820.0000

Figure C-2-Continued.

21650.0000	31110.0000	35500.0000	31330.0000	19880.0000
-1.9640	99.9600	730.5000	2170.0000	4089.0000
6218.0000	8356.0000	10310.0000	11500.0000	12400.0000
16940.0000	24320.0000	27870.0000	24810.0000	15920.0000
-1.5280	79.5900	581.5000	1726.0000	3253.0000
4945.0000	6643.0000	8198.0000	9147.0000	9873.0000
13480.0000	19330.0000	22190.0000	19850.0000	12800.0000
-.9966	57.7100	421.5000	1251.0000	2357.0000
3581.0000	4808.0000	5932.0000	6621.0000	7149.0000
9748.0000	13950.0000	16020.0000	14360.0000	9307.0000
-.5894	40.9600	299.1000	887.6000	1672.0000
2539.0000	3406.0000	4200.0000	4687.0000	5060.0000
6887.0000	9828.0000	11260.0000	10100.0000	6567.0000
-.2567	31.5300	230.2000	683.3000	1288.0000
1955.0000	2622.0000	3233.0000	3608.0000	3897.0000
5296.0000	7542.0000	8636.0000	7755.0000	5076.0000
-.1259	25.3000	184.7000	548.4000	1034.0000
1569.0000	2104.0000	2594.0000	2895.0000	3126.0000
4245.0000	6038.0000	6909.0000	6207.0000	4076.0000
.0699	20.5200	149.8000	445.1000	839.7000
1274.0000	1709.0000	2107.0000	2353.0000	2544.0000
3450.0000	4900.0000	5607.0000	5049.0000	3345.0000
.1920	16.5300	120.7000	358.9000	677.7000
1029.0000	1379.0000	1700.0000	1900.0000	2055.0000
2784.0000	3949.0000	4519.0000	4077.0000	2724.0000
.3524	13.0800	95.4700	284.3000	537.8000
816.4000	1094.0000	1350.0000	1511.0000	1637.0000
2214.0000	3135.0000	3590.0000	3254.0000	2208.0000
.5439	9.9800	72.8700	217.6000	413.1000
627.4000	841.4000	1039.0000	1166.0000	1268.0000
1710.0000	2417.0000	2774.0000	2536.0000	1767.0000
.3890	6.7790	49.4900	147.8000	280.6000
425.9000	570.8000	704.9000	790.5000	858.8000
1157.0000	1631.0000	1868.0000	1706.0000	1190.0000
2.1200	4.3940	32.1500	100.3000	201.5000
309.5000	418.6000	529.1000	617.4000	702.7000
929.5000	1304.0000	1570.0000	1599.0000	1426.0000
-5.3850	50.5400	667.5000	2790.0000	5522.0000
8852.0000	12240.0000	15320.0000	16810.0000	17720.0000
23400.0000	35320.0000	41630.0000	34760.0000	20840.0000
-5.5870	53.1300	700.3000	2912.0000	5754.0000
9184.0000	12650.0000	15830.0000	17480.0000	18570.0000
24480.0000	36710.0000	43790.0000	37850.0000	23570.0000
-4.5570	43.9900	579.1000	2399.0000	4736.0000
7539.0000	10360.0000	12960.0000	14370.0000	15350.0000
20210.0000	30140.0000	36220.0000	32070.0000	20500.0000
-3.4650	34.4400	453.3000	1876.0000	3703.0000
5888.0000	8084.0000	10110.0000	11230.0000	12020.0000
15820.0000	23550.0000	28370.0000	25350.0000	16390.0000
-2.6960	27.4300	360.9000	1493.0000	2946.0000
4682.0000	6426.0000	8036.0000	8930.0000	9571.0000
12590.0000	18720.0000	22570.0000	20260.0000	13170.0000
-1.7590	19.8800	261.6000	1082.0000	2134.0000
3390.0000	4650.0000	5814.0000	6463.0000	6930.0000
9106.0000	13510.0000	16280.0000	14650.0000	9569.0000
-1.0400	14.1100	185.7000	767.6000	1514.0000
2404.0000	3295.0000	4117.0000	4575.0000	4905.0000
6436.0000	9520.0000	11450.0000	10310.0000	6752.0000
-.4531	10.8500	143.0000	590.9000	1166.0000
1851.0000	2536.0000	3168.0000	3522.0000	3778.0000

4951.0000	7307.0000	8777.0000	7911.0000	5214.0000
-.2222	8.7030	114.7000	474.2000	936.2000
1485.0000	2034.0000	2542.0000	2826.0000	3031.0000
3970.0000	5850.0000	7021.0000	6331.0000	4186.0000
.1232	7.0500	93.0700	384.7000	760.4000
1206.0000	1652.0000	2064.0000	2296.0000	2465.0000
3227.0000	4748.0000	5696.0000	5148.0000	3431.0000
.3386	5.6760	75.0200	310.2000	613.6000
973.3000	1333.0000	1665.0000	1854.0000	1992.0000
2605.0000	3827.0000	4589.0000	4155.0000	2791.0000
.6217	4.4800	59.3700	245.6000	486.8000
772.2000	1057.0000	1322.0000	1474.0000	1586.0000
2072.0000	3038.0000	3643.0000	3312.0000	2257.0000
.9596	3.4080	45.3600	187.8000	373.8000
592.9000	812.0000	1016.0000	1136.0000	1227.0000
1601.0000	2341.0000	2811.0000	2576.0000	1800.0000
.6864	2.3140	30.8100	127.5000	253.9000
402.5000	551.0000	689.4000	770.3000	831.7000
1084.0000	1581.0000	1894.0000	1734.0000	1212.0000
3.7410	1.4200	20.3100	85.4400	180.9000
288.8000	398.2000	509.3000	593.7000	673.7000
874.2000	1257.0000	1558.0000	1585.0000	1406.0000
-8.0870	.0371	473.3000	2294.0000	4795.0000
8058.0000	11400.0000	14630.0000	16420.0000	17720.0000
22640.0000	35330.0000	43520.0000	36030.0000	21550.0000
-8.3920	.0390	496.8000	2396.0000	5003.0000
8368.0000	11790.0000	15110.0000	17040.0000	18520.0000
23670.0000	36570.0000	45360.0000	38980.0000	24250.0000
-6.8460	.0323	410.9000	1976.0000	4122.0000
6873.0000	9653.0000	12370.0000	13990.0000	15280.0000
19520.0000	29950.0000	37290.0000	32870.0000	21020.0000
-5.2060	.0254	321.6000	1546.0000	3223.0000
5369.0000	7534.0000	9648.0000	10930.0000	11960.0000
15280.0000	23380.0000	29140.0000	25940.0000	16780.0000
-4.0500	.0202	256.1000	1230.0000	2565.0000
4270.0000	5989.0000	7668.0000	8692.0000	9516.0000
12160.0000	18570.0000	23160.0000	20710.0000	13480.0000
-2.6420	.0147	185.6000	891.3000	1859.0000
3092.0000	4335.0000	5548.0000	6290.0000	6888.0000
8794.0000	13400.0000	16690.0000	14970.0000	9791.0000
-1.5630	.0105	131.7000	632.5000	1319.0000
2193.0000	3071.0000	3929.0000	4453.0000	4876.0000
6217.0000	9445.0000	11730.0000	10530.0000	6907.0000
-.6808	.0082	101.4000	486.9000	1016.0000
1688.0000	2364.0000	3024.0000	3428.0000	3754.0000
4783.0000	7249.0000	8993.0000	8079.0000	5331.0000
-.3340	.0066	81.3600	390.7000	815.7000
1355.0000	1897.0000	2426.0000	2750.0000	3012.0000
3835.0000	5804.0000	7193.0000	6465.0000	4278.0000
.1849	.0055	65.9700	317.0000	662.6000
1100.0000	1540.0000	1970.0000	2234.0000	2449.0000
3117.0000	4710.0000	5833.0000	5254.0000	3504.0000
.5085	.0045	53.1500	255.6000	534.8000
888.0000	1243.0000	1589.0000	1804.0000	1978.0000
2517.0000	3796.0000	4697.0000	4239.0000	2847.0000
.9337	.0037	42.0300	202.3000	424.4000
704.5000	985.8000	1261.0000	1433.0000	1574.0000
2002.0000	3012.0000	3726.0000	3375.0000	2298.0000
1.4410	.0030	32.0600	154.7000	325.9000
541.0000	757.0000	969.4000	1104.0000	1217.0000

Figure C-2-Continued.

1547.0000	2320.0000	2870.0000	2621.0000	1827.0000
1.0310	.0020	21.7700	105.1000	221.4000
367.3000	513.7000	657.5000	748.7000	824.5000
1047.0000	1567.0000	1934.0000	1764.0000	1231.0000
5.6190	.0024	14.0200	70.2000	158.2000
263.1000	370.0000	482.5000	570.8000	656.9000
839.9000	1231.0000	1556.0000	1575.0000	1388.0000
-10.9700	-18.3000	281.2000	1786.0000	4036.0000
7080.0000	10210.0000	13500.0000	15820.0000	17750.0000
22310.0000	35800.0000	45370.0000	37010.0000	22100.0000
-11.3900	-19.2200	295.3000	1869.0000	4219.0000
7369.0000	10580.0000	13970.0000	16410.0000	18510.0000
23270.0000	36870.0000	46870.0000	39800.0000	24770.0000
-9.2890	-15.9100	244.4000	1543.0000	3481.0000
6062.0000	8684.0000	11440.0000	13470.0000	15240.0000
19170.0000	30090.0000	38290.0000	33420.0000	21410.0000
-7.0640	-12.4500	191.3000	1207.0000	2723.0000
4738.0000	6782.0000	8933.0000	10520.0000	11920.0000
15000.0000	23460.0000	29860.0000	26330.0000	17070.0000
-5.4960	-9.9110	152.3000	960.8000	2167.0000
3769.0000	5393.0000	7101.0000	8368.0000	9482.0000
11930.0000	18620.0000	23700.0000	21010.0000	13700.0000
-3.5860	-7.1730	110.4000	696.4000	1571.0000
2730.0000	3904.0000	5139.0000	6056.0000	6863.0000
8631.0000	13440.0000	17080.0000	15180.0000	9951.0000
-2.1210	-5.0790	78.3800	494.3000	1115.0000
1937.0000	2767.0000	3640.0000	4288.0000	4857.0000
6102.0000	9468.0000	12000.0000	10680.0000	7020.0000
-.9241	-3.8870	60.3200	380.6000	859.3000
1492.0000	2131.0000	2802.0000	3300.0000	3739.0000
4694.0000	7266.0000	9196.0000	8191.0000	5416.0000
-.4534	-3.1110	48.4000	305.5000	689.9000
1197.0000	1710.0000	2248.0000	2648.0000	3000.0000
3764.0000	5818.0000	7355.0000	6555.0000	4345.0000
.2506	-2.5040	39.2500	247.9000	560.6000
972.6000	1389.0000	1826.0000	2151.0000	2439.0000
3059.0000	4720.0000	5962.0000	5324.0000	3556.0000
.6897	-2.0030	31.6200	199.9000	452.6000
785.0000	1121.0000	1473.0000	1737.0000	1969.0000
2470.0000	3803.0000	4800.0000	4294.0000	2887.0000
1.2670	-1.5620	25.0000	158.3000	359.4000
623.0000	889.4000	1169.0000	1380.0000	1566.0000
1964.0000	3016.0000	3804.0000	3417.0000	2328.0000
1.9550	-1.1620	19.0700	121.1000	276.3000
478.7000	683.4000	899.1000	1063.0000	1209.0000
1516.0000	2321.0000	2927.0000	2649.0000	1846.0000
1.3980	-.7870	12.9500	82.2700	187.7000
325.1000	463.8000	610.0000	720.5000	819.4000
1027.0000	1568.0000	1973.0000	1784.0000	1244.0000
7.6220	-.3039	8.3240	55.4700	135.8000
234.8000	336.5000	449.0000	546.2000	642.9000
816.2000	1216.0000	1557.0000	1562.0000	1370.0000
-13.8500	14.4700	152.8000	1349.0000	3371.0000
6110.0000	8955.0000	12160.0000	14940.0000	17580.0000
22100.0000	36100.0000	46730.0000	37870.0000	22300.0000
-14.3800	15.2200	160.6000	1414.0000	3529.0000
6375.0000	9315.0000	12620.0000	15520.0000	18290.0000
23010.0000	37020.0000	47920.0000	40510.0000	24910.0000
-11.7300	12.6100	132.9000	1168.0000	2915.0000
5253.0000	7659.0000	10360.0000	12740.0000	15040.0000

18930.0000	30130.0000	38960.0000	33900.0000	21480.0000
-8.9230	9.8850	104.1000	914.5000	2281.0000
4108.0000	5986.0000	8092.0000	9955.0000	11760.0000
14800.0000	23470.0000	30320.0000	26670.0000	17110.0000
-6.9420	7.8790	82.8900	728.0000	1816.0000
3269.0000	4762.0000	6436.0000	7917.0000	9355.0000
11770.0000	18620.0000	24050.0000	21260.0000	13730.0000
-4.5290	5.7330	60.0900	527.8000	1317.0000
2369.0000	3449.0000	4659.0000	5730.0000	6770.0000
8516.0000	13430.0000	17320.0000	15360.0000	9968.0000
-2.6790	4.0920	42.6500	374.7000	934.8000
1681.0000	2446.0000	3301.0000	4058.0000	4792.0000
6022.0000	9466.0000	12170.0000	10800.0000	7033.0000
-1.1670	3.1860	32.8300	288.6000	720.6000
1295.0000	1884.0000	2542.0000	3124.0000	3688.0000
4632.0000	7264.0000	9324.0000	8286.0000	5425.0000
-.5730	2.5720	26.3400	231.7000	578.7000
1040.0000	1512.0000	2040.0000	2507.0000	2959.0000
3714.0000	5816.0000	7457.0000	6630.0000	4352.0000
.3161	2.1180	21.3600	188.1000	470.4000
844.9000	1228.0000	1657.0000	2037.0000	2405.0000
3018.0000	4718.0000	6043.0000	5384.0000	3560.0000
.8707	1.7320	17.2100	151.7000	380.0000
682.2000	991.7000	1338.0000	1644.0000	1942.0000
2436.0000	3801.0000	4864.0000	4341.0000	2890.0000
1.5990	1.4070	13.6100	120.3000	301.9000
541.8000	787.6000	1063.0000	1307.0000	1544.0000
1937.0000	3014.0000	3853.0000	3452.0000	2328.0000
2.4690	1.1250	10.3800	92.1300	232.4000
416.8000	605.8000	817.7000	1006.0000	1191.0000
1495.0000	2317.0000	2961.0000	2673.0000	1843.0000
1.7660	.7679	7.0480	62.5900	157.9000
283.1000	411.3000	554.8000	682.6000	807.1000
1012.0000	1566.0000	1996.0000	1800.0000	1242.0000
9.6240	.8461	4.5300	42.9800	116.3000
207.7000	302.8000	412.8000	517.8000	626.8000
797.4000	1201.0000	1552.0000	1552.0000	1347.0000
-16.5600	79.9600	76.2900	1047.0000	2858.0000
5273.0000	7813.0000	10830.0000	13990.0000	17150.0000
21830.0000	35630.0000	46830.0000	38740.0000	22700.0000
-17.1900	84.0600	80.1800	1099.0000	2996.0000
5514.0000	8152.0000	11270.0000	14550.0000	17830.0000
22700.0000	36490.0000	47850.0000	41240.0000	25270.0000
-14.0300	69.6000	66.3800	908.6000	2476.0000
4550.0000	6718.0000	9277.0000	11960.0000	14660.0000
18660.0000	29670.0000	38820.0000	34390.0000	21750.0000
-10.6700	54.5200	51.9800	711.3000	1939.0000
3560.0000	5254.0000	7253.0000	9348.0000	11460.0000
14590.0000	23100.0000	30190.0000	27020.0000	17310.0000
-8.3030	43.4200	41.3900	566.4000	1544.0000
2834.0000	4181.0000	5770.0000	7435.0000	9116.0000
11600.0000	18330.0000	23930.0000	21530.0000	13880.0000
-5.4170	31.5100	30.0100	410.7000	1119.0000
2054.0000	3030.0000	4179.0000	5383.0000	6597.0000
8391.0000	13220.0000	17230.0000	15550.0000	10070.0000
-3.2040	22.3900	21.3000	291.6000	794.9000
1458.0000	2149.0000	2963.0000	3813.0000	4670.0000
5933.0000	9318.0000	12110.0000	10940.0000	7108.0000
-1.3970	17.2800	16.3900	224.7000	613.0000
1124.0000	1656.0000	2282.0000	2936.0000	3595.0000

Figure C-2-Continued.

4564.0000	7151.0000	9278.0000	8387.0000	5481.0000	1448.0000	2197.0000	2865.0000	2754.0000	1920.0000
-.6856	13.8800	13.1500	180.4000	492.4000	2.4150	6.2670	1.7670	41.1600	118.5000
902.4000	1330.0000	1832.0000	2356.0000	2884.0000	219.2000	323.6000	454.1000	604.6000	763.6000
3660.0000	5726.0000	7421.0000	6710.0000	4397.0000	980.8000	1485.0000	1932.0000	1856.0000	1295.0000
.3776	11.3000	10.6600	146.5000	400.5000	13.1600	4.6310	1.1040	28.8500	90.1400
733.8000	1081.0000	1489.0000	1915.0000	2344.0000	166.9000	247.8000	349.2000	464.3000	589.5000
2974.0000	4644.0000	6013.0000	5448.0000	3595.0000	764.1000	1137.0000	1493.0000	1551.0000	1342.0000
1.0410	9.1320	8.5910	118.2000	323.6000	-20.8700	158.1000	18.8200	805.6000	2264.0000
592.8000	873.0000	1202.0000	1546.0000	1892.0000	4237.0000	6283.0000	8955.0000	12390.0000	16160.0000
2400.0000	3742.0000	4840.0000	4391.0000	2917.0000	21150.0000	31560.0000	42440.0000	41930.0000	26050.0000
1.9120	7.2670	6.7920	93.7600	257.3000	-21.6800	166.2000	19.7800	845.6000	2376.0000
471.2000	693.9000	955.7000	1229.0000	1504.0000	4442.0000	6581.0000	9367.0000	12930.0000	16810.0000
1908.0000	2967.0000	3833.0000	3490.0000	2347.0000	21970.0000	32590.0000	43690.0000	44100.0000	28740.0000
2.9510	5.6070	5.1800	71.9200	198.4000	-17.6900	137.6000	16.3800	699.4000	1966.0000
363.0000	534.6000	736.4000	947.0000	1160.0000	3671.0000	5436.0000	7732.0000	10650.0000	13830.0000
1471.0000	2281.0000	2945.0000	2700.0000	1855.0000	18050.0000	26650.0000	35630.0000	36480.0000	24580.0000
2.1110	3.8130	3.5180	48.8700	134.8000	-13.4600	107.8000	12.8300	547.6000	1539.0000
246.6000	363.0000	499.8000	642.4000	786.4000	2874.0000	4256.0000	6051.0000	8329.0000	10810.0000
996.5000	1541.0000	1986.0000	1818.0000	1251.0000	14100.0000	20790.0000	27760.0000	28580.0000	19510.0000
11.5100	2.8820	2.2550	34.1200	101.1000	-10.4700	85.8500	10.2100	436.0000	1226.0000
184.4000	272.5000	377.9000	489.8000	607.9000	2289.0000	3388.0000	4817.0000	6627.0000	8599.0000
779.9000	1176.0000	1532.0000	1545.0000	1334.0000	11210.0000	16510.0000	22030.0000	22740.0000	15620.0000
-18.9400	132.1000	38.4700	880.6000	2499.0000	-6.8320	62.2900	7.4030	316.2000	889.2000
4653.0000	6896.0000	9737.0000	13090.0000	16640.0000	1660.0000	2457.0000	3491.0000	4800.0000	6224.0000
21540.0000	34070.0000	45350.0000	40140.0000	23880.0000	8111.0000	11920.0000	15880.0000	16400.0000	11320.0000
-19.6700	138.9000	40.4500	924.2000	2621.0000	-4.0410	44.2700	5.2520	224.5000	631.7000
4873.0000	7212.0000	10170.0000	13630.0000	17310.0000	1178.0000	1744.0000	2476.0000	3402.0000	4407.0000
22380.0000	34980.0000	46410.0000	42480.0000	26490.0000	5736.0000	8411.0000	11170.0000	11530.0000	7983.0000
-16.0500	115.0000	33.4900	764.4000	2168.0000	-1.7620	34.1600	4.0390	173.0000	487.4000
4025.0000	5952.0000	8382.0000	11220.0000	14230.0000	909.0000	1345.0000	1909.0000	2620.0000	3393.0000
18380.0000	28490.0000	37680.0000	35290.0000	22740.0000	4413.0000	6459.0000	8563.0000	8837.0000	6145.0000
-12.2100	90.0600	26.2200	598.5000	1697.0000	-.8651	27.4500	3.2390	138.9000	391.6000
3150.0000	4658.0000	6557.0000	8773.0000	11120.0000	730.2000	1080.0000	1533.0000	2103.0000	2722.0000
14360.0000	22190.0000	29320.0000	27690.0000	18080.0000	3539.0000	5174.0000	6852.0000	7069.0000	4926.0000
-9.5000	71.7300	20.8800	476.6000	1352.0000	.4754	22.3300	2.6230	112.8000	318.7000
2508.0000	3708.0000	5219.0000	6980.0000	8849.0000	594.2000	878.8000	1247.0000	1710.0000	2212.0000
11420.0000	17620.0000	23250.0000	22050.0000	14490.0000	2875.0000	4199.0000	5555.0000	5734.0000	4018.0000
-6.1980	52.0400	15.1400	345.6000	980.4000	1.3120	18.0600	2.1110	90.9900	257.7000
1819.0000	2688.0000	3781.0000	5054.0000	6404.0000	480.4000	710.5000	1008.0000	1381.0000	1786.0000
8262.0000	12710.0000	16740.0000	15910.0000	10510.0000	2321.0000	3385.0000	4473.0000	4619.0000	3253.0000
-3.6660	36.9700	10.7400	245.4000	696.3000	2.4100	14.3700	1.6650	72.1600	205.2000
1291.0000	1907.0000	2681.0000	3581.0000	4534.0000	382.4000	565.6000	802.2000	1099.0000	1420.0000
5842.0000	8962.0000	11770.0000	11190.0000	7414.0000	1844.0000	2686.0000	3546.0000	3667.0000	2607.0000
-1.5980	28.5200	8.2640	189.1000	537.1000	3.7200	11.0900	1.2650	55.3300	158.4000
995.6000	1470.0000	2066.0000	2758.0000	3490.0000	295.4000	437.0000	619.7000	847.8000	1095.0000
4494.0000	6879.0000	9020.0000	8579.0000	5713.0000	1422.0000	2068.0000	2727.0000	2829.0000	2046.0000
-.7847	22.9100	6.6300	151.8000	431.5000	2.6610	7.5400	.8587	37.5900	107.7000
799.6000	1181.0000	1659.0000	2214.0000	2800.0000	200.7000	296.9000	420.8000	575.2000	742.6000
3604.0000	5509.0000	7215.0000	6864.0000	4581.0000	963.2000	1398.0000	1840.0000	1906.0000	1379.0000
.4317	18.6300	5.3730	123.3000	351.1000	14.5000	5.7100	.5164	26.1300	82.7800
650.5000	960.4000	1349.0000	1800.0000	2276.0000	154.8000	230.9000	328.1000	444.7000	573.5000
2928.0000	4469.0000	5847.0000	5570.0000	3742.0000	749.0000	1085.0000	1436.0000	1568.0000	1375.0000
1.1900	15.0500	4.3260	99.5200	283.8000	-22.2500	179.3000	6.1270	778.2000	2147.0000
525.7000	776.1000	1090.0000	1453.0000	1837.0000	4022.0000	5951.0000	8509.0000	11910.0000	15730.0000
2363.0000	3602.0000	4707.0000	4489.0000	3033.0000	20630.0000	28740.0000	38890.0000	43240.0000	28630.0000
2.1870	11.9700	3.4170	78.9400	225.9000	-23.1100	188.5000	6.4420	816.8000	2254.0000
418.2000	617.4000	867.0000	1156.0000	1461.0000	4217.0000	6238.0000	8909.0000	12430.0000	16380.0000
1878.0000	2856.0000	3729.0000	3565.0000	2437.0000	21440.0000	29880.0000	40360.0000	45270.0000	31400.0000
3.3760	9.2180	2.6020	60.5700	174.3000	-18.8600	156.1000	5.3340	675.5000	1864.0000
322.7000	476.5000	669.0000	891.2000	1126.0000	3487.0000	5155.0000	7358.0000	10250.0000	13470.0000

Figure C-2-Continued.

17620.0000	24550.0000	33100.0000	37330.0000	26740.0000
-14.3500	122.3000	4.1770	528.9000	1460.0000
2730.0000	4037.0000	5760.0000	8016.0000	10530.0000
13770.0000	19190.0000	25850.0000	29210.0000	21190.0000
-11.1600	97.3700	3.3260	421.1000	1163.0000
2174.0000	3214.0000	4586.0000	6379.0000	8380.0000
10950.0000	15260.0000	20540.0000	23220.0000	16950.0000
-7.2840	70.6600	2.4110	305.4000	843.5000
1577.0000	2331.0000	3324.0000	4621.0000	6066.0000
7923.0000	11020.0000	14820.0000	16740.0000	12280.0000
-4.3080	50.2100	1.7110	216.8000	599.2000
1120.0000	1654.0000	2358.0000	3275.0000	4296.0000
5604.0000	7782.0000	10430.0000	11770.0000	8651.0000
-1.8780	38.7500	1.3160	167.0000	462.4000
863.7000	1276.0000	1818.0000	2523.0000	3307.0000
4311.0000	5979.0000	8000.0000	9020.0000	6652.0000
-.9225	31.1400	1.0550	134.1000	371.5000
693.9000	1025.0000	1460.0000	2026.0000	2654.0000
3458.0000	4791.0000	6403.0000	7215.0000	5329.0000
.5066	25.3500	.8549	108.9000	302.4000
564.7000	834.3000	1188.0000	1647.0000	2157.0000
2809.0000	3891.0000	5194.0000	5851.0000	4341.0000
1.3980	20.5000	.6882	87.8100	244.5000
456.6000	674.6000	960.6000	1331.0000	1742.0000
2268.0000	3138.0000	4185.0000	4712.0000	3511.0000
2.5690	16.3200	.5432	69.6000	194.7000
363.6000	537.3000	764.9000	1059.0000	1385.0000
1802.0000	2493.0000	3320.0000	3739.0000	2808.0000
3.9650	12.6000	.4130	53.3200	150.4000
281.0000	415.4000	591.2000	817.3000	1068.0000
1390.0000	1922.0000	2557.0000	2882.0000	2195.0000
2.8360	8.5700	.2804	36.2300	102.3000
190.9000	282.2000	401.5000	554.6000	724.3000
941.6000	1300.0000	1726.0000	1942.0000	1479.0000
15.4600	6.5530	.1714	24.8900	78.8200
148.1000	221.2000	315.5000	430.9000	560.5000
733.6000	1029.0000	1371.0000	1579.0000	1420.0000
-23.0100	214.2000	1.8580	774.5000	2149.0000
4011.0000	5895.0000	8345.0000	11580.0000	15210.0000
19780.0000	26170.0000	35440.0000	43070.0000	30650.0000
-23.9000	225.1000	1.9540	812.8000	2256.0000
4205.0000	6178.0000	8739.0000	12100.0000	15860.0000
20610.0000	27390.0000	37100.0000	45080.0000	33460.0000
-19.5100	186.4000	1.6180	672.2000	1866.0000
3476.0000	5106.0000	7219.0000	9975.0000	13060.0000
16960.0000	22610.0000	30600.0000	37160.0000	28410.0000
-14.8400	146.0000	1.2670	526.2000	1461.0000
2722.0000	3998.0000	5652.0000	7805.9000	10210.0000
13260.0000	17700.0000	23950.0000	29070.0000	22480.0000
-11.5500	116.3000	1.0090	419.0000	1164.0000
2167.0000	3183.0000	4500.0000	6212.0000	8124.0000
10550.0000	14090.0000	19050.0000	23120.0000	17970.0000
-7.5330	84.3600	.7315	303.8000	844.2000
1572.0000	2308.0000	3262.0000	4500.0000	5882.0000
7633.0000	10180.0000	13750.0000	16670.0000	13010.0000
-4.4560	59.9400	.5193	215.7000	599.7000
1116.0000	1638.0000	2314.0000	3190.0000	4165.0000
5400.0000	7193.0000	9689.0000	11720.0000	9163.0000
-1.9430	46.2400	.3998	166.1000	462.7000
861.0000	1264.0000	1784.0000	2458.0000	3208.0000

4156.0000	5531.0000	7437.0000	8979.0000	7041.0000
-.9542	37.1400	.3209	133.4000	371.7000
691.7000	1015.0000	1433.0000	1973.0000	2574.0000
3333.0000	4433.0000	5954.0000	7182.0000	5639.0000
.5237	30.2100	.2603	108.3000	302.5000
562.9000	826.2000	1166.0000	1605.0000	2093.0000
2709.0000	3602.0000	4833.0000	5825.0000	4590.0000
1.4450	24.4100	.2099	87.3100	244.6000
455.1000	668.0000	942.7000	1297.0000	1690.0000
2187.0000	2908.0000	3896.0000	4691.0000	3709.0000
2.6560	19.4100	.1661	69.1800	194.7000
362.3000	532.0000	750.7000	1032.0000	1344.0000
1739.0000	2312.0000	3094.0000	3722.0000	2962.0000
4.1010	14.9600	.1269	52.9700	150.3000
279.9000	411.3000	580.4000	796.9000	1037.0000
1342.0000	1787.0000	2388.0000	2869.0000	2310.0000
2.9330	10.1700	.0862	35.9900	102.2000
190.2000	279.4000	394.1000	540.7000	703.4000
909.3000	1208.0000	1612.0000	1933.0000	1556.0000
15.9900	7.5500	.0569	24.5200	78.2600
146.9000	218.6000	310.3000	422.0000	547.6000
714.3000	978.0000	1308.0000	1571.0000	1456.0000
-23.1100	254.7000	1.8450	790.7000	2252.0000
4161.0000	6076.0000	8424.0000	11320.0000	14550.0000
18760.0000	24420.0000	32860.0000	40960.0000	31090.0000
-24.0000	267.7000	1.9400	829.7000	2363.0000
4361.0000	6363.0000	8819.0000	11840.0000	15200.0000
19600.0000	25680.0000	34610.0000	43090.0000	33910.0000
-19.6000	221.6000	1.6060	686.1000	1954.0000
3603.0000	5256.0000	7283.0000	9769.0000	12530.0000
16170.0000	21270.0000	28680.0000	35650.0000	28770.0000
-14.9100	173.5000	1.2580	537.1000	1530.0000
2821.0000	4115.0000	5701.0000	7645.0000	9807.0000
12650.0000	16670.0000	22480.0000	27930.0000	22760.0000
-11.6000	138.2000	1.0020	427.7000	1218.0000
2246.0000	3276.0000	4539.0000	6085.0000	7805.0000
10070.0000	13270.0000	17900.0000	22220.0000	18200.0000
-7.5670	100.2000	.7265	310.1000	883.6000
1629.0000	2375.0000	3290.0000	4409.0000	5652.0000
7287.0000	9602.0000	12930.0000	16030.0000	13170.0000
-4.4760	71.2000	.5158	220.1000	627.6000
1156.0000	1686.0000	2334.0000	3125.0000	4004.0000
5157.0000	6784.0000	9116.0000	11270.0000	9274.0000
-1.9520	54.8700	.3971	169.5000	484.1000
891.8000	1300.0000	1800.0000	2409.0000	3084.0000
3969.0000	5218.0000	7001.0000	8642.0000	7125.0000
-.9586	44.0700	.3187	136.1000	388.9000
716.4000	1044.0000	1445.0000	1934.0000	2475.0000
3184.0000	4184.0000	5607.0000	6914.0000	5706.0000
.5260	35.8000	.2586	110.5000	316.4000
582.8000	849.7000	1176.0000	1573.0000	2013.0000
2589.0000	3402.0000	4554.0000	5609.0000	4644.0000
1.4520	28.9000	.2085	89.0900	255.7000
471.1000	686.9000	950.6000	1271.0000	1626.0000
2091.0000	2747.0000	3673.0000	4519.0000	3751.0000
2.6680	22.9400	.1651	70.5800	203.4000
374.9000	546.8000	756.9000	1012.0000	1294.0000
1664.0000	2186.0000	2920.0000	3587.0000	2995.0000
4.1190	17.6200	.1262	54.0300	156.9000
289.3000	422.4000	585.0000	781.6000	999.5000

Figure C-2-Continued.

1285.0000	1692.0000	2257.0000	2768.0000	2335.0000	15230.0000	20990.0000	27250.0000	30460.0000	25960.0000
2.9460	11.9700	.0857	36.7100	106.7000	-13.8000	196.4000	10.6300	571.0000	1705.0000
196.6000	286.9000	397.3000	530.5000	677.8000	3145.0000	4577.0000	6142.0000	7714.0000	9385.0000
870.9000	1145.0000	1524.0000	1865.0000	1573.0000	11930.0000	16460.0000	21390.0000	23980.0000	20580.0000
16.0600	8.4960	.0569	24.9000	80.5900	-10.7300	156.4000	8.4680	454.7000	1358.0000
150.2000	222.5000	311.7000	416.3000	533.7000	2503.0000	3643.0000	4889.0000	6141.0000	7472.0000
693.6000	944.0000	1261.0000	1535.0000	1464.0000	9498.0000	13110.0000	17050.0000	19120.0000	16470.0000
-22.5600	281.7000	6.6450	794.9000	2400.0000	-7.0040	113.4000	6.1380	329.7000	984.5000
4404.0000	6404.0000	8692.0000	11230.0000	14000.0000	1815.0000	2641.0000	3543.0000	4449.0000	5412.0000
17890.0000	23700.0000	31350.0000	37430.0000	29780.0000	6878.0000	9486.0000	12320.0000	13820.0000	11930.0000
-23.4300	295.9000	6.9870	834.2000	2517.0000	-4.1430	80.4700	4.3560	234.1000	699.2000
4611.0000	6701.0000	9093.0000	11750.0000	14650.0000	1288.0000	1874.0000	2513.0000	3154.0000	3835.0000
18750.0000	24980.0000	33150.0000	39720.0000	32580.0000	4869.0000	6703.0000	8689.0000	9734.0000	8410.0000
-19.1300	244.9000	5.7860	689.9000	2081.0000	-1.8060	61.9500	3.3500	180.3000	539.1000
3809.0000	5531.0000	7506.0000	9699.0000	12100.0000	993.2000	1444.0000	1937.0000	2431.0000	2955.0000
15490.0000	20710.0000	27550.0000	33070.0000	27700.0000	3750.0000	5157.0000	6676.0000	7473.0000	6469.0000
-14.5500	191.8000	4.5310	540.1000	1629.0000	-.8870	49.7200	2.6870	144.8000	433.1000
2981.0000	4329.0000	5875.0000	7591.0000	9469.0000	797.6000	1160.0000	1555.0000	1951.0000	2372.0000
12130.0000	16240.0000	21620.0000	25970.0000	21930.0000	3009.0000	4134.0000	5348.0000	5983.0000	5184.0000
-11.3200	152.7000	3.6080	430.1000	1297.0000	.4872	40.3300	2.1770	117.5000	352.2000
2373.0000	3446.0000	4677.0000	6043.0000	7537.0000	648.6000	943.2000	1265.0000	1588.0000	1930.0000
9657.0000	12940.0000	17220.0000	20690.0000	17540.0000	2448.0000	3362.0000	4346.0000	4862.0000	4225.0000
-7.3870	110.8000	2.6150	311.8000	940.9000	1.3440	32.5100	1.7530	94.8200	284.6000
1721.0000	2498.0000	3390.0000	4378.0000	5460.0000	524.0000	762.0000	1022.0000	1283.0000	1560.0000
6991.0000	9363.0000	12450.0000	14940.0000	12700.0000	1978.0000	2716.0000	3507.0000	3923.0000	3418.0000
-4.3700	78.6400	1.8550	221.4000	668.2000	2.4700	25.7300	1.3840	75.1600	226.2000
1222.0000	1773.0000	2404.0000	3104.0000	3868.0000	416.6000	606.0000	813.2000	1021.0000	1242.0000
4949.0000	6616.0000	8778.0000	10510.0000	8946.0000	1576.0000	2162.0000	2791.0000	3123.0000	2735.0000
-1.9050	60.5800	1.4270	170.5000	515.3000	3.8130	19.6500	1.0530	57.5900	174.3000
941.9000	1367.0000	1854.0000	2392.0000	2980.0000	321.1000	467.4000	627.8000	789.4000	961.3000
3811.0000	5091.0000	6743.0000	8065.0000	6876.0000	1220.0000	1675.0000	2161.0000	2422.0000	2142.0000
-.9357	48.6300	1.1440	136.9000	413.9000	2.7270	13.3500	.7148	39.1300	118.5000
756.5000	1098.0000	1488.0000	1921.0000	2392.0000	218.1000	317.4000	426.3000	535.7000	652.0000
3057.0000	4082.0000	5402.0000	6454.0000	5508.0000	826.6000	1133.0000	1459.0000	1632.0000	1443.0000
.5137	39.4800	.9268	111.1000	336.6000	14.8700	8.7770	.4403	26.9400	88.3400
615.3000	892.9000	1211.0000	1563.0000	1946.0000	163.6000	240.9000	329.8000	422.3000	523.9000
2487.0000	3320.0000	4389.0000	5240.0000	4485.0000	674.6000	942.8000	1234.0000	1421.0000	1405.0000
1.4180	31.8400	.7459	89.6500	272.0000	-19.6700	280.8000	27.5600	838.9000	2540.0000
497.2000	721.6000	978.8000	1263.0000	1573.0000	4820.0000	7127.0000	9607.0000	11960.0000	14400.0000
2009.0000	2681.0000	3542.0000	4225.0000	3625.0000	18140.0000	25170.0000	31440.0000	31950.0000	25970.0000
2.6050	25.2300	.5886	71.0500	216.3000	-20.4200	294.9000	28.9700	880.7000	2664.0000
395.4000	574.1000	779.1000	1005.0000	1252.0000	5043.0000	7445.0000	10030.0000	12500.0000	15080.0000
1600.0000	2135.0000	2818.0000	3358.0000	2896.0000	19020.0000	26470.0000	33320.0000	34410.0000	28690.0000
4.0220	19.3200	.4473	54.4200	166.7000	-16.6700	244.0000	23.9900	728.5000	2202.0000
304.9000	443.1000	601.8000	777.0000	968.2000	4164.0000	6140.0000	8270.0000	10310.0000	12450.0000
1237.0000	1654.0000	2181.0000	2597.0000	2261.0000	15730.0000	21920.0000	27720.0000	28950.0000	24550.0000
2.8760	13.1300	.3036	36.9700	113.3000	-12.6800	191.0000	18.7900	570.4000	1724.0000
207.2000	301.0000	408.6000	527.3000	656.7000	3258.0000	4803.0000	6470.0000	8067.0000	9747.0000
838.5000	1119.0000	1472.0000	1750.0000	1523.0000	12320.0000	17180.0000	21770.0000	22830.0000	19490.0000
15.6800	8.9480	.1838	25.3000	84.5800	-9.8650	152.1000	14.9600	454.2000	1373.0000
156.4000	230.6000	318.6000	415.6000	523.7000	2594.0000	3823.0000	5149.0000	6421.0000	7759.0000
677.9000	931.9000	1236.0000	1478.0000	1441.0000	9807.0000	13680.0000	17340.0000	18220.0000	15610.0000
-21.4000	288.5000	15.6000	840.5000	2513.0000	-6.4370	110.3000	10.8500	329.4000	995.9000
4651.0000	6784.0000	9103.0000	11420.0000	13850.0000	1880.0000	2771.0000	3731.0000	4651.0000	5620.0000
17540.0000	24020.0000	30900.0000	33950.0000	27670.0000	7101.0000	9898.0000	12540.0000	13180.0000	11320.0000
-22.2200	303.1000	16.4000	882.0000	2635.0000	-3.8070	78.2400	7.7000	233.9000	707.3000
4867.0000	7091.0000	9514.0000	11940.0000	14510.0000	1335.0000	1966.0000	2646.0000	3297.0000	3981.0000
18410.0000	25310.0000	32740.0000	36360.0000	30420.0000	5026.0000	6992.0000	8838.0000	9283.0000	7979.0000
-18.1400	250.8000	13.5800	729.4000	2178.0000	-1.6600	60.2000	5.9280	180.3000	545.6000
4018.0000	5850.0000	7849.0000	9856.0000	11980.0000	1029.0000	1515.0000	2039.0000	2540.0000	3067.0000

Figure C-2-Continued.

3870.0000	5377.0000	6790.0000	7131.0000	6142.0000
-.8150	48.3000	4.7570	144.8000	438.3000
826.4000	1216.0000	1637.0000	2039.0000	2462.0000
3105.0000	4311.0000	5438.0000	5710.0000	4923.0000
.4481	39.1500	3.8590	117.6000	356.5000
672.1000	989.2000	1331.0000	1659.0000	2003.0000
2526.0000	3505.0000	4419.0000	4643.0000	4016.0000
1.2360	31.5300	3.1100	94.9300	288.2000
543.0000	799.1000	1075.0000	1340.0000	1619.0000
2041.0000	2830.0000	3566.0000	3749.0000	3251.0000
2.2710	24.9200	2.4600	75.3300	229.2000
431.8000	635.4000	855.4000	1067.0000	1289.0000
1625.0000	2252.0000	2838.0000	2988.0000	2606.0000
3.5050	18.9900	1.8790	57.8300	176.8000
332.8000	489.8000	660.0000	823.9000	996.6000
1258.0000	1743.0000	2197.0000	2322.0000	2046.0000
2.5070	12.8900	1.2760	39.3000	120.2000
226.1000	332.7000	448.1000	559.1000	675.9000
852.1000	1179.0000	1483.0000	1565.0000	1379.0000
13.6700	8.1460	.8340	27.8200	90.8000
169.9000	251.6000	344.4000	438.2000	540.5000
692.7000	972.6000	1254.0000	1395.0000	1381.0000
-17.4700	178.5000	29.4800	800.5000	2503.0000
4910.0000	7400.0000	10160.0000	12830.0000	15700.0000
19650.0000	26920.0000	32670.0000	32070.0000	25340.0000
-18.1400	187.5000	30.9900	840.8000	2628.0000
5141.0000	7730.0000	10600.0000	13390.0000	16390.0000
20540.0000	28230.0000	34590.0000	34610.0000	28080.0000
-14.8000	155.2000	25.6600	695.8000	2174.0000
4245.0000	6374.0000	8736.0000	11030.0000	13510.0000
16950.0000	23330.0000	28760.0000	29150.0000	24080.0000
-11.2600	121.5000	20.1000	544.9000	1702.0000
3323.0000	4987.0000	6833.0000	8628.0000	10570.0000
13270.0000	18270.0000	22570.0000	22990.0000	19130.0000
-8.7590	96.7700	16.0100	434.0000	1356.0000
2645.0000	3969.0000	5438.0000	6866.0000	8409.0000
10560.0000	14540.0000	17980.0000	18360.0000	15330.0000
-5.7150	70.1500	11.6200	314.8000	983.4000
1918.0000	2876.0000	3939.0000	4972.0000	6088.0000
7641.0000	10510.0000	12990.0000	13280.0000	11120.0000
-3.3800	49.7900	8.2600	223.7000	698.6000
1361.0000	2041.0000	2793.0000	3523.0000	4311.0000
5406.0000	7424.0000	9157.0000	9352.0000	7837.0000
-1.4730	38.3200	6.3770	172.5000	539.1000
1050.0000	1573.0000	2152.0000	2714.0000	3320.0000
4161.0000	5707.0000	7032.0000	7183.0000	6034.0000
-.7234	30.7500	5.1260	138.6000	433.2000
843.1000	1263.0000	1728.0000	2178.0000	2664.0000
3338.0000	4574.0000	5632.0000	5752.0000	4837.0000
.3982	24.9300	4.1750	112.7000	352.6000
685.8000	1027.0000	1405.0000	1771.0000	2166.0000
2714.0000	3717.0000	4575.0000	4677.0000	3948.0000
1.0980	20.0900	3.3780	91.0800	285.1000
554.2000	829.6000	1135.0000	1431.0000	1750.0000
2192.0000	3000.0000	3691.0000	3776.0000	3198.0000
2.0170	15.8800	2.6920	72.4200	227.1000
440.9000	659.7000	902.4000	1138.0000	1392.0000
1744.0000	2386.0000	2936.0000	3010.0000	2566.0000
3.1130	12.1100	2.0830	55.8000	175.5000
340.0000	508.6000	696.0000	878.4000	1075.0000

1348.0000	1844.0000	2272.0000	2339.0000	2017.0000
2.2270	8.2270	1.4170	37.9300	119.3000
231.0000	345.4000	472.4000	595.9000	729.1000
912.9000	1247.0000	1533.0000	1577.0000	1359.0000
12.1400	5.2850	1.1080	28.2000	92.4600
175.4000	261.8000	361.4000	462.4000	573.9000
731.0000	1016.0000	1290.0000	1412.0000	1383.0000
-14.9100	124.1000	11.5800	756.8000	2483.0000
5002.0000	7648.0000	10770.0000	13900.0000	17390.0000
21830.0000	29140.0000	34590.0000	33940.0000	25930.0000
-15.4800	130.4000	12.1900	795.3000	2609.0000
5240.0000	7992.0000	11230.0000	14470.0000	18080.0000
22720.0000	30430.0000	36540.0000	36570.0000	28770.0000
-12.6300	107.9000	10.1100	658.5000	2159.0000
4330.0000	6592.0000	9247.0000	11910.0000	14870.0000
18680.0000	25080.0000	30330.0000	30760.0000	24690.0000
-9.6040	84.5000	7.9340	515.8000	1691.0000
3389.0000	5157.0000	7231.0000	9310.0000	11620.0000
14600.0000	19620.0000	23790.0000	24250.0000	19630.0000
-7.4720	67.2800	6.3300	410.9000	1347.0000
2699.0000	4105.0000	5754.0000	7406.0000	9242.0000
11620.0000	15610.0000	18940.0000	19360.0000	15730.0000
-4.8750	48.7700	4.6270	298.2000	977.3000
1957.0000	2975.0000	4168.0000	5362.0000	6688.0000
8402.0000	11280.0000	13680.0000	14000.0000	11410.0000
-2.8840	34.6100	3.3240	211.9000	694.4000
1389.0000	2110.0000	2954.0000	3799.0000	4734.0000
5941.0000	7960.0000	9639.0000	9851.0000	8038.0000
-1.2570	26.6200	2.6250	163.7000	536.1000
1071.0000	1627.0000	2276.0000	2925.0000	3644.0000
4570.0000	6117.0000	7399.0000	7563.0000	6187.0000
-.6168	21.3500	2.1330	131.6000	430.9000
860.5000	1306.0000	1827.0000	2347.0000	2923.0000
3665.0000	4901.0000	5924.0000	6054.0000	4959.0000
.3401	17.3000	1.7880	107.2000	351.0000
700.1000	1062.0000	1485.0000	1908.0000	2376.0000
2978.0000	3981.0000	4811.0000	4921.0000	4047.0000
.9370	13.9300	1.4860	86.7300	284.0000
566.0000	858.3000	1200.0000	1541.0000	1918.0000
2403.0000	3211.0000	3880.0000	3971.0000	3277.0000
1.7210	11.0000	1.2430	69.1500	226.5000
450.4000	682.6000	953.9000	1225.0000	1525.0000
1910.0000	2552.0000	3084.0000	3163.0000	2629.0000
2.6570	8.3720	1.0410	53.5500	175.4000
347.8000	526.5000	735.5000	944.6000	1176.0000
1474.0000	1970.0000	2384.0000	2456.0000	2067.0000
1.9000	5.6840	.7139	36.4200	119.3000
236.3000	357.6000	499.2000	640.7000	797.0000
998.2000	1332.0000	1609.0000	1654.0000	1392.0000
10.3600	3.5220	1.0910	28.8600	95.1600
181.8000	272.6000	380.8000	492.1000	616.6000
784.0000	1071.0000	1342.0000	1467.0000	1416.0000
-12.1300	49.5500	-12.3600	745.6000	2559.0000
5179.0000	7988.0000	11440.0000	15060.0000	19180.0000
24280.0000	31820.0000	37060.0000	36670.0000	27170.0000
-12.5900	52.0800	-12.9600	784.0000	2689.0000
5428.0000	8348.0000	11920.0000	15640.0000	19870.0000
25140.0000	33080.0000	39020.0000	39390.0000	30170.0000
-10.2700	43.1200	-10.7000	649.3000	2226.0000
4486.0000	6887.0000	9813.0000	12850.0000	16300.0000

Figure C-2-Continued.

20600.0000	27180.0000	32310.0000	33060.0000	25900.0000
-7.8110	33.7600	-8.3410	508.8000	1744.0000
3513.0000	5388.0000	7672.0000	10040.0000	12730.0000
16080.0000	21230.0000	25320.0000	26040.0000	20590.0000
-6.0770	26.8800	-6.6170	405.3000	1389.0000
2797.0000	4289.0000	6104.0000	7987.0000	10120.0000
12780.0000	16880.0000	20160.0000	20780.0000	16500.0000
-3.9650	19.4900	-4.7200	294.3000	1008.0000
2028.0000	3108.0000	4421.0000	5781.0000	7318.0000
9240.0000	12190.0000	14550.0000	15010.0000	11960.0000
-2.3450	13.8300	-3.2680	209.3000	716.5000
1440.0000	2205.0000	3134.0000	4094.0000	5177.0000
6529.0000	8598.0000	10240.0000	10560.0000	8425.0000
-1.0220	10.6300	-2.3770	161.8000	553.4000
1111.0000	1700.0000	2414.0000	3152.0000	3983.0000
5020.0000	6603.0000	7859.0000	8101.0000	6482.0000
-.5014	8.5300	-1.8510	130.1000	444.9000
892.2000	1365.0000	1937.0000	2529.0000	3195.0000
4024.0000	5289.0000	6291.0000	6482.0000	5194.0000
.2769	6.9100	-1.3810	106.2000	362.6000
726.1000	1110.0000	1575.0000	2055.0000	2595.0000
3268.0000	4294.0000	5106.0000	5266.0000	4236.0000
.7624	5.5620	-1.0180	86.0700	293.6000
587.1000	896.9000	1272.0000	1659.0000	2094.0000
2636.0000	3462.0000	4116.0000	4247.0000	3429.0000
1.4000	4.3910	-.6644	68.8300	234.3000
467.5000	713.5000	1011.0000	1318.0000	1664.0000
2094.0000	2749.0000	3270.0000	3379.0000	2748.0000
2.1610	3.3390	-.3144	53.5800	181.8000
361.2000	550.5000	779.5000	1016.0000	1281.0000
1613.0000	2120.0000	2525.0000	2619.0000	2158.0000
1.5460	2.2670	-.1999	36.4600	123.6000
245.5000	373.8000	529.0000	688.9000	868.4000
1092.0000	1432.0000	1703.0000	1764.0000	1453.0000
8.4260	1.3880	1.1800	30.7400	100.8000
191.0000	286.6000	402.9000	524.9000	662.7000
843.3000	1136.0000	1406.0000	1541.0000	1466.0000
-9.2840	.0963	-44.7600	759.0000	2751.0000
5510.0000	8541.0000	12310.0000	16270.0000	20800.0000
26660.0000	34810.0000	39740.0000	39180.0000	28370.0000
-9.6340	.1015	-46.9900	798.4000	2892.0000
5777.0000	8923.0000	12810.0000	16870.0000	21490.0000
27470.0000	36000.0000	41720.0000	42010.0000	31540.0000
-7.8600	.0843	-38.8600	661.4000	2394.0000
4775.0000	7359.0000	10540.0000	13840.0000	17590.0000
22440.0000	29470.0000	34470.0000	35200.0000	27100.0000
-5.9770	.0664	-30.3600	518.4000	1876.0000
3738.0000	5758.0000	8236.0000	10810.0000	13720.0000
17500.0000	23000.0000	26990.0000	27710.0000	21550.0000
-4.6500	.0531	-24.1300	413.0000	1494.0000
2977.0000	4583.0000	6552.0000	8597.0000	10910.0000
13900.0000	18270.0000	21470.0000	22100.0000	17270.0000
-3.0340	.0392	-17.3600	300.0000	1085.0000
2159.0000	3321.0000	4744.0000	6221.0000	7885.0000
10040.0000	13180.0000	15490.0000	15960.0000	12520.0000
-1.7940	.0286	-12.1800	213.5000	770.8000
1532.0000	2356.0000	3362.0000	4404.0000	5577.0000
7093.0000	9292.0000	10900.0000	11220.0000	8811.0000
-.7818	.0233	-9.1260	165.3000	595.4000
1182.0000	1816.0000	2589.0000	3390.0000	4289.0000

5451.0000	7132.0000	8357.0000	8600.0000	6776.0000
-.3836	.0192	-7.2250	133.0000	478.7000
949.6000	1458.0000	2078.0000	2719.0000	3439.0000
4369.0000	5711.0000	6687.0000	6879.0000	5427.0000
.2121	.0166	-5.6450	108.7000	390.2000
772.9000	1186.0000	1689.0000	2209.0000	2793.0000
3546.0000	4634.0000	5425.0000	5585.0000	4425.0000
.5837	.0143	-4.3810	88.2600	316.1000
625.0000	958.0000	1364.0000	1783.0000	2253.0000
2860.0000	3735.0000	4371.0000	4502.0000	3580.0000
1.0720	.0126	-3.2160	70.8000	252.4000
497.8000	762.0000	1084.0000	1417.0000	1789.0000
2270.0000	2964.0000	3470.0000	3580.0000	2868.0000
1.6540	.0114	-2.1130	55.4000	196.0000
384.8000	588.0000	835.4000	1091.0000	1377.0000
1747.0000	2282.0000	2678.0000	2772.0000	2250.0000
1.1830	.0078	-1.4110	37.7200	133.3000
261.5000	399.2000	566.8000	739.7000	933.0000
1182.0000	1542.0000	1805.0000	1866.0000	1514.0000
6.4500	.0170	1.4050	33.7500	109.9000
204.7000	306.4000	430.4000	560.5000	706.9000
902.6000	1209.0000	1478.0000	1614.0000	1521.0000
-6.5420	-18.4700	-88.0400	812.8000	3033.0000
5998.0000	9344.0000	13460.0000	17590.0000	22310.0000
28870.0000	37720.0000	42240.0000	40800.0000	29260.0000
-6.7880	-19.3900	-92.4700	854.3000	3189.0000
6286.0000	9753.0000	13980.0000	18210.0000	23000.0000
29650.0000	38850.0000	44260.0000	43760.0000	32610.0000
-5.5370	-16.0400	-76.4900	708.0000	2641.0000
5196.0000	8039.0000	11480.0000	14920.0000	18800.0000
24160.0000	31710.0000	36510.0000	36680.0000	28060.0000
-4.2110	-12.5500	-59.7900	555.0000	2069.0000
4068.0000	6289.0000	8973.0000	11650.0000	14660.0000
18820.0000	24710.0000	28570.0000	28870.0000	22330.0000
-3.2760	-9.9930	-47.5400	442.2000	1648.0000
3239.0000	5005.0000	7137.0000	9259.0000	11650.0000
14950.0000	19620.0000	22720.0000	23020.0000	17900.0000
-2.1370	-7.2350	-34.2500	321.3000	1196.0000
2349.0000	3626.0000	5166.0000	6698.0000	8420.0000
10790.0000	14150.0000	16380.0000	16620.0000	12970.0000
-1.2640	-5.1250	-24.0700	228.8000	850.2000
1667.0000	2571.0000	3660.0000	4740.0000	5953.0000
7617.0000	9967.0000	11520.0000	11680.0000	9125.0000
-.5506	-3.9270	-18.1300	177.3000	656.8000
1286.0000	1982.0000	2818.0000	3648.0000	4577.0000
5851.0000	7646.0000	8828.0000	8951.0000	7015.0000
-.2701	-3.1450	-14.3900	142.8000	528.0000
1033.0000	1591.0000	2261.0000	2926.0000	3670.0000
4688.0000	6121.0000	7062.0000	7158.0000	5617.0000
.1496	-2.5360	-11.3200	116.8000	430.5000
840.7000	1294.0000	1838.0000	2377.0000	2980.0000
3805.0000	4965.0000	5728.0000	5810.0000	4579.0000
.4114	-2.0320	-8.8510	95.0000	348.7000
679.8000	1045.0000	1484.0000	1918.0000	2403.0000
3067.0000	3999.0000	4613.0000	4682.0000	3704.0000
.7554	-1.5900	-6.5980	76.3900	278.5000
541.4000	831.2000	1179.0000	1523.0000	1908.0000
2433.0000	3172.0000	3661.0000	3722.0000	2966.0000
1.1660	-1.1890	-4.4840	60.0400	216.4000
418.6000	641.1000	907.9000	1172.0000	1468.0000

Figure C-2-Continued.

1871.0000	2440.0000	2822.0000	2881.0000	2327.0000
.8339	-.8064	-3.0060	40.8900	147.2000
284.4000	435.2000	615.9000	794.3000	994.2000
1266.0000	1648.0000	1902.0000	1938.0000	1565.0000
4.5450	-.3610	1.8030	38.3200	121.9000
223.0000	332.8000	465.1000	599.8000	750.9000
960.5000	1282.0000	1549.0000	1675.0000	1573.0000
-4.0770	-101.8000	-139.0000	881.4000	3389.0000
6631.0000	10370.0000	14850.0000	19220.0000	24020.0000
30970.0000	40150.0000	44250.0000	41750.0000	29900.0000
-4.2290	-106.8000	-146.1000	927.9000	3564.0000
6947.0000	10810.0000	15390.0000	19840.0000	24710.0000
31720.0000	41270.0000	46350.0000	44900.0000	33430.0000
-3.4490	-88.3600	-120.8000	769.2000	2952.0000
5740.0000	8903.0000	12620.0000	16230.0000	20170.0000
25800.0000	33620.0000	38220.0000	37700.0000	28840.0000
-2.6230	-69.1500	-94.4600	603.1000	2313.0000
4494.0000	6962.0000	9857.0000	12660.0000	15720.0000
20090.0000	26190.0000	29900.0000	29700.0000	22960.0000
-2.0410	-55.0500	-75.1200	480.6000	1843.0000
3578.0000	5539.0000	7838.0000	10060.0000	12490.0000
15950.0000	20780.0000	23780.0000	23690.0000	18410.0000
-1.3310	-39.8500	-54.1300	349.3000	1337.0000
2594.0000	4012.0000	5672.0000	7277.0000	9023.0000
11510.0000	14980.0000	17140.0000	17100.0000	13340.0000
-.7874	-28.2200	-38.0600	248.8000	950.2000
1841.0000	2845.0000	4017.0000	5148.0000	6377.0000
8121.0000	10550.0000	12040.0000	12010.0000	9384.0000
-.3430	-21.6200	-28.6900	193.0000	734.0000
1420.0000	2192.0000	3092.0000	3960.0000	4902.0000
6236.0000	8088.0000	9228.0000	9200.0000	7212.0000
-.1682	-17.3100	-22.7800	155.5000	590.1000
1141.0000	1759.0000	2481.0000	3176.0000	3929.0000
4996.0000	6473.0000	7380.0000	7356.0000	5774.0000
.0933	-13.9500	-17.9500	127.5000	481.1000
928.2000	1430.0000	2015.0000	2579.0000	3190.0000
4053.0000	5249.0000	5984.0000	5970.0000	4706.0000
.2564	-11.1700	-14.0500	103.8000	389.7000
750.5000	1155.0000	1627.0000	2081.0000	2572.0000
3267.0000	4227.0000	4819.0000	4810.0000	3806.0000
.4707	-8.7280	-10.5100	83.6700	311.3000
597.6000	918.3000	1292.0000	1652.0000	2041.0000
2591.0000	3351.0000	3823.0000	3823.0000	3048.0000
.7265	-6.5180	-7.1840	66.0300	241.9000
462.0000	707.9000	994.4000	1271.0000	1570.0000
1991.0000	2577.0000	2946.0000	2959.0000	2391.0000
.5196	-4.4180	-4.8200	44.9900	164.5000
313.8000	480.5000	674.4000	861.3000	1063.0000
1347.0000	1740.0000	1984.0000	1990.0000	1608.0000
2.8320	-1.8880	2.5480	44.0200	136.7000
245.8000	365.3000	506.1000	646.5000	800.6000
1019.0000	1349.0000	1616.0000	1730.0000	1625.0000
-2.0580	-235.9000	-187.3000	1025.0000	3877.0000
7424.0000	11560.0000	16420.0000	21100.0000	26160.0000
32960.0000	41970.0000	45730.0000	42610.0000	30720.0000
-2.1350	-247.5000	-196.8000	1079.0000	4076.0000
7773.0000	12030.0000	16980.0000	21720.0000	26830.0000
33710.0000	43140.0000	47990.0000	46000.0000	34460.0000
-1.7410	-204.6000	-162.9000	895.0000	3376.0000
6420.0000	9897.0000	13900.0000	17740.0000	21850.0000

27380.0000	35140.0000	39620.0000	38710.0000	29790.0000
-1.3240	-160.1000	-127.3000	701.8000	2646.0000
5025.0000	7736.0000	10850.0000	13830.0000	17020.0000
21310.0000	27370.0000	31000.0000	30520.0000	23750.0000
-1.0300	-127.5000	-101.2000	559.4000	2107.0000
4001.0000	6154.0000	8624.0000	10980.0000	13510.0000
16910.0000	21720.0000	24650.0000	24350.0000	19050.0000
-.6719	-92.2500	-72.9100	406.6000	1529.0000
2900.0000	4457.0000	6239.0000	7940.0000	9758.0000
12200.0000	15650.0000	17770.0000	17570.0000	13800.0000
-.3974	-65.3200	-51.2400	289.7000	1087.0000
2058.0000	3159.0000	4417.0000	5615.0000	6893.0000
8604.0000	11010.0000	12480.0000	12330.0000	9703.0000
-.1731	-50.0100	-38.5800	224.8000	839.2000
1587.0000	2433.0000	3399.0000	4318.0000	5296.0000
6605.0000	8442.0000	9558.0000	9448.0000	7454.0000
-.0849	-40.0300	-30.6100	181.2000	674.6000
1274.0000	1953.0000	2726.0000	3462.0000	4245.0000
5290.0000	6755.0000	7642.0000	7553.0000	5967.0000
.0471	-32.2300	-24.0700	148.6000	550.0000
1037.0000	1587.0000	2214.0000	2811.0000	3445.0000
4291.0000	5477.0000	6196.0000	6129.0000	4862.0000
.1294	-25.7900	-18.8100	121.0000	445.4000
838.3000	1282.0000	1787.0000	2267.0000	2777.0000
3458.0000	4410.0000	4988.0000	4938.0000	3932.0000
.2376	-20.1300	-14.0000	97.6500	355.7000
667.4000	1018.0000	1419.0000	1799.0000	2203.0000
2742.0000	3496.0000	3956.0000	3925.0000	3148.0000
.3667	-15.0000	-9.4930	77.1900	276.3000
515.7000	784.7000	1091.0000	1383.0000	1694.0000
2107.0000	2688.0000	3049.0000	3039.0000	2470.0000
.2623	-10.1700	-6.3630	52.6000	187.9000
350.3000	532.5000	740.0000	937.2000	1146.0000
1425.0000	1814.0000	2053.0000	2042.0000	1660.0000
1.4300	-4.1080	3.9930	52.3100	155.7000
273.3000	402.6000	552.3000	699.7000	859.5000
1077.0000	1410.0000	1678.0000	1787.0000	1686.0000
-.6527	-423.1000	-106.0000	1355.0000	4606.0000
8446.0000	12910.0000	18080.0000	23110.0000	28470.0000
34830.0000	43190.0000	46890.0000	43860.0000	31790.0000
-.6770	-443.7000	-111.3000	1428.0000	4840.0000
8833.0000	13410.0000	18650.0000	23720.0000	29110.0000
35590.0000	44490.0000	49350.0000	47500.0000	35800.0000
-.5521	-366.8000	-91.9700	1184.0000	4007.0000
7290.0000	11020.0000	15250.0000	19330.0000	23660.0000
28900.0000	36290.0000	40820.0000	40060.0000	31020.0000
-.4198	-287.0000	-71.7100	928.2000	3140.0000
5705.0000	8609.0000	11900.0000	15060.0000	18410.0000
22480.0000	28280.0000	31970.0000	31600.0000	24750.0000
-.3266	-228.4000	-56.9100	739.7000	2501.0000
4541.0000	6847.0000	9455.0000	11960.0000	14610.0000
17840.0000	22440.0000	25430.0000	25220.0000	19860.0000
-.2130	-165.3000	-40.6400	537.5000	1814.0000
3291.0000	4957.0000	6837.0000	8639.0000	10550.0000
12860.0000	16170.0000	18320.0000	18200.0000	14390.0000
-.1260	-117.0000	-28.1800	382.7000	1289.0000
2335.0000	3512.0000	4838.0000	6106.0000	7447.0000
9069.0000	11370.0000	12860.0000	12770.0000	10110.0000
-.0549	-89.5500	-20.5800	296.7000	994.9000
1800.0000	2704.0000	3722.0000	4694.0000	5720.0000

Figure C-2-Continued.

6960.0000	8718.0000	9849.0000	9776.0000	7762.0000
-.0269	-71.6700	-16.0600	239.0000	799.6000
1445.0000	2170.0000	2985.0000	3763.0000	4583.0000
5574.0000	6974.0000	7873.0000	7813.0000	6211.0000
.0149	-57.6800	-12.0600	195.7000	651.5000
1176.0000	1764.0000	2424.0000	3054.0000	3719.0000
4520.0000	5654.0000	6382.0000	6339.0000	5060.0000
.0411	-46.1300	-8.9560	159.2000	527.4000
950.1000	1424.0000	1956.0000	2463.0000	2997.0000
3642.0000	4553.0000	5138.0000	5106.0000	4090.0000
.0754	-35.9700	-5.9560	128.2000	420.9000
756.1000	1131.0000	1552.0000	1954.0000	2377.0000
2887.0000	3609.0000	4075.0000	4058.0000	3275.0000
.1163	-26.7500	-3.0010	101.0000	326.5000
583.8000	871.0000	1194.0000	1502.0000	1826.0000
2219.0000	2776.0000	3141.0000	3142.0000	2569.0000
.0832	-18.1200	-1.9280	68.7700	221.9000
396.4000	590.9000	809.1000	1017.0000	1236.0000
1500.0000	1872.0000	2114.0000	2110.0000	1725.0000
.4534	-6.9650	9.2410	65.9200	181.3000
307.2000	444.7000	601.7000	756.7000	923.4000
1136.0000	1465.0000	1740.0000	1857.0000	1757.0000
-.0198	-419.2000	143.1000	2020.0000	5641.0000
9789.0000	14430.0000	19790.0000	25020.0000	30630.0000
36380.0000	44080.0000	48020.0000	45500.0000	32920.0000
-.0206	-440.1000	150.9000	2127.0000	5920.0000
10220.0000	14960.0000	20380.0000	25630.0000	31260.0000
37210.0000	45570.0000	50730.0000	49440.0000	37240.0000
-.0168	-364.1000	125.3000	1763.0000	4896.0000
8420.0000	12270.0000	16640.0000	20860.0000	25370.0000
30220.0000	37260.0000	42060.0000	41770.0000	32360.0000
-.0127	-284.9000	98.5900	1382.0000	3835.0000
6587.0000	9584.0000	12970.0000	16240.0000	19730.0000
23520.0000	29060.0000	32970.0000	32970.0000	25840.0000
-.0099	-226.7000	78.7700	1101.0000	3054.0000
5242.0000	7620.0000	10310.0000	12900.0000	15660.0000
18660.0000	23070.0000	26230.0000	26320.0000	20750.0000
-.0065	-164.0000	57.8700	799.4000	2215.0000
3798.0000	5515.0000	7451.0000	9314.0000	11300.0000
13460.0000	16620.0000	18900.0000	18990.0000	15030.0000
-.0038	-116.0000	41.8700	568.6000	1573.0000
2693.0000	3906.0000	5270.0000	6581.0000	7972.0000
9482.0000	11690.0000	13260.0000	13310.0000	10550.0000
-.0017	-88.5200	33.5500	439.9000	1213.0000
2075.0000	3007.0000	4053.0000	5057.0000	6122.0000
7276.0000	8957.0000	10150.0000	10190.0000	8096.0000
-.0008	-70.7500	27.4700	353.9000	974.9000
1666.0000	2412.0000	3250.0000	4054.0000	4904.0000
5825.0000	7165.0000	8112.0000	8138.0000	6476.0000
.0005	-56.7600	23.4400	289.1000	793.9000
1355.0000	1960.0000	2639.0000	3290.0000	3978.0000
4724.0000	5808.0000	6575.0000	6601.0000	5275.0000
.0012	-45.2500	19.8100	234.6000	642.2000
1094.0000	1582.0000	2128.0000	2652.0000	3206.0000
3806.0000	4677.0000	5292.0000	5315.0000	4263.0000
.0023	-35.0600	17.0200	188.0000	511.9000
870.4000	1256.0000	1689.0000	2104.0000	2542.0000
3017.0000	3707.0000	4197.0000	4223.0000	3412.0000
.0035	-25.7700	14.8600	146.9000	396.3000
671.4000	967.0000	1298.0000	1616.0000	1952.0000

2319.0000	2853.0000	3236.0000	3269.0000	2676.0000
.0025	-17.4300	10.2200	99.9800	269.3000
455.8000	655.9000	880.0000	1095.0000	1321.0000
1567.0000	1923.0000	2176.0000	2194.0000	1795.0000
.0138	-4.5720	19.2900	88.3400	214.9000
349.3000	491.5000	653.7000	814.0000	986.7000
1193.0000	1519.0000	1805.0000	1938.0000	1836.0000
-.3118	-241.9000	647.6000	2930.0000	6896.0000
11340.0000	16140.0000	21600.0000	26740.0000	32310.0000
37600.0000	45090.0000	49510.0000	46920.0000	33990.0000
-.3234	-254.2000	681.9000	3081.0000	7223.0000
11810.0000	16690.0000	22200.0000	27370.0000	32970.0000
38540.0000	46790.0000	52480.0000	51190.0000	38650.0000
-.2637	-210.4000	565.4000	2551.0000	5967.0000
9715.0000	13670.0000	18100.0000	22260.0000	26760.0000
31350.0000	38350.0000	43600.0000	43350.0000	33700.0000
-.2005	-164.5000	443.4000	1999.0000	4671.0000
7595.0000	10670.0000	14110.0000	17330.0000	20810.0000
24410.0000	29930.0000	34200.0000	34250.0000	26950.0000
-.1560	-130.8000	353.5000	1592.0000	3719.0000
6042.0000	8484.0000	11200.0000	13760.0000	16510.0000
19370.0000	23770.0000	27220.0000	27350.0000	21650.0000
-.1018	-94.3600	257.1000	1156.0000	2696.0000
4376.0000	6138.0000	8098.0000	9933.0000	11910.0000
13970.0000	17130.0000	19610.0000	19730.0000	15680.0000
-.0602	-66.4400	183.3000	821.3000	1913.0000
3102.0000	4346.0000	5726.0000	7015.0000	8404.0000
9839.0000	12040.0000	13750.0000	13820.0000	11000.0000
-.0262	-50.2400	142.6000	634.4000	1475.0000
2389.0000	3344.0000	4402.0000	5390.0000	6452.0000
7548.0000	9222.0000	10520.0000	10570.0000	8435.0000
-.0129	-39.9600	115.0000	510.0000	1185.0000
1918.0000	2683.0000	3530.0000	4319.0000	5168.0000
6043.0000	7376.0000	8406.0000	8443.0000	6744.0000
.0071	-31.6300	94.5700	415.8000	964.3000
1559.0000	2179.0000	2865.0000	3505.0000	4192.0000
4901.0000	5979.0000	6813.0000	6847.0000	5491.0000
.0196	-24.8700	77.2300	336.8000	779.6000
1259.0000	1758.0000	2311.0000	2826.0000	3378.0000
3948.0000	4814.0000	5482.0000	5512.0000	4436.0000
.0360	-18.7700	62.6000	269.0000	620.8000
1001.0000	1396.0000	1833.0000	2241.0000	2678.0000
3130.0000	3816.0000	4347.0000	4378.0000	3550.0000
.0556	-13.0800	49.8600	208.9000	479.7000
771.1000	1074.0000	1409.0000	1722.0000	2057.0000
2406.0000	2938.0000	3353.0000	3390.0000	2784.0000
.0397	-8.7980	34.0100	142.1000	325.8000
513.3000	728.2000	954.6000	1166.0000	1391.0000
1625.0000	1979.0000	2253.0000	2274.0000	1866.0000
.2166	2.7220	36.2600	117.4000	254.5000
396.8000	543.6000	709.1000	869.7000	1044.0000
1248.0000	1578.0000	1881.0000	2020.0000	1919.0000
-1.6570	98.1900	1324.0000	3976.0000	8162.0000
12980.0000	18030.0000	23480.0000	28270.0000	33440.0000
38460.0000	46210.0000	50830.0000	47920.0000	34570.0000
-1.7190	103.5000	1393.0000	4173.0000	8534.0000
13480.0000	18600.0000	24090.0000	28950.0000	34210.0000
39570.0000	48130.0000	54120.0000	52560.0000	39560.0000
-1.4020	86.0000	1155.0000	3452.0000	7042.0000
11080.0000	15210.0000	19630.0000	23550.0000	27800.0000

Figure C-2-Continued.

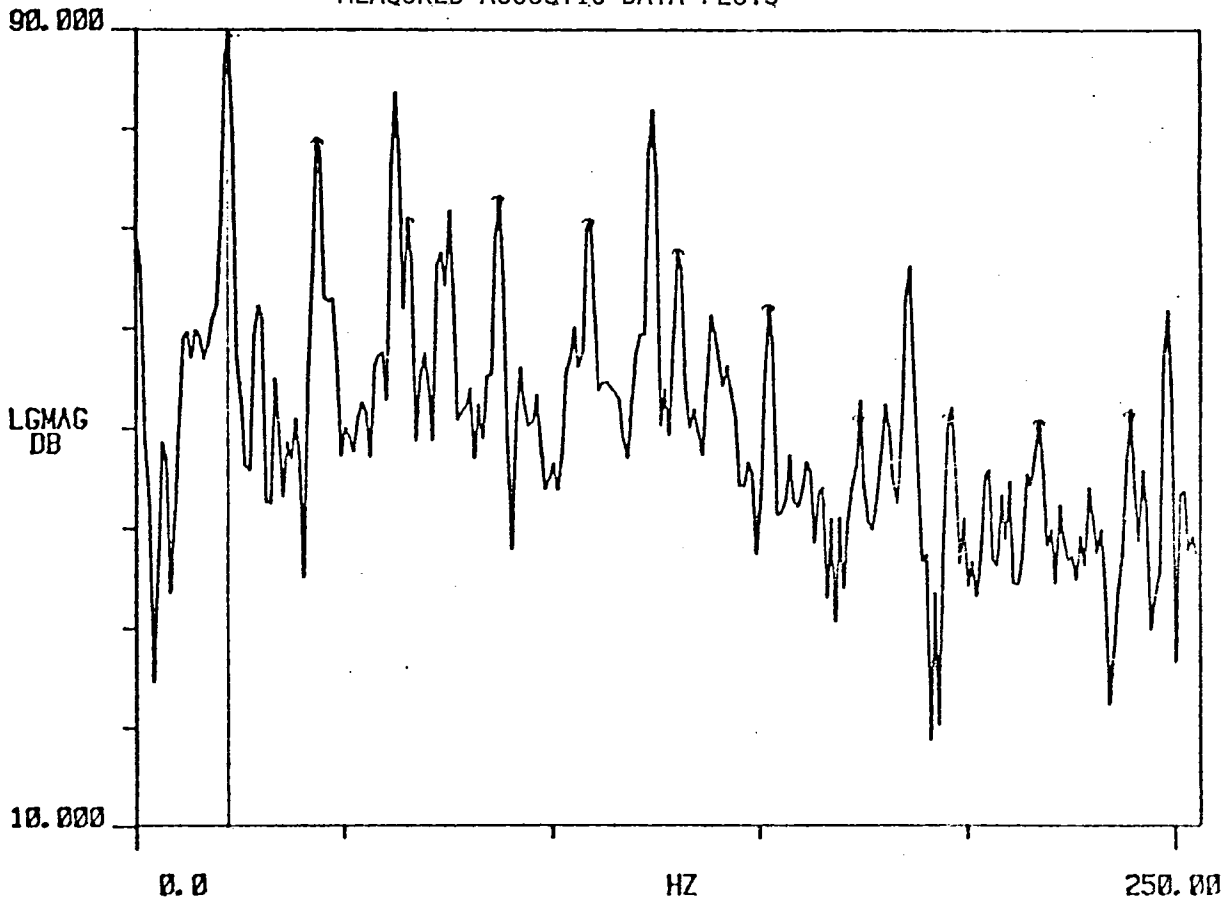
32270.0000	39540.0000	45080.0000	44680.0000	34640.0000	7983.0000	9789.0000	11160.0000	11080.0000	8843.0000
-1.0660	67.6800	905.0000	2704.0000	5511.0000	-.0648	93.4500	366.3000	862.7000	1600.0000
8656.0000	11870.0000	15290.0000	18340.0000	21640.0000	2436.0000	3269.0000	4098.0000	4786.0000	5529.0000
25140.0000	30890.0000	35390.0000	35340.0000	27750.0000	6389.0000	7826.0000	8915.0000	8842.0000	7067.0000
-.8290	54.1000	721.1000	2153.0000	4387.0000	.1815	76.8600	298.6000	702.1000	1301.0000
6885.0000	9430.0000	12140.0000	14560.0000	17170.0000	1979.0000	2654.0000	3326.0000	3884.0000	4486.0000
19960.0000	24540.0000	28180.0000	28240.0000	22310.0000	5182.0000	6343.0000	7223.0000	7170.0000	5754.0000
-.5409	39.8200	523.6000	1562.0000	3179.0000	.3309	62.7900	241.8000	567.6000	1051.0000
4984.0000	6820.0000	8771.0000	10510.0000	12390.0000	1597.0000	2141.0000	2681.0000	3131.0000	3615.0000
14390.0000	17680.0000	20300.0000	20370.0000	16160.0000	4175.0000	5106.0000	5811.0000	5770.0000	4648.0000
-.3199	28.8900	372.5000	1109.0000	2255.0000	.5348	50.9200	193.1000	452.0000	836.3000
3531.0000	4826.0000	6199.0000	7420.0000	8735.0000	1269.0000	1699.0000	2127.0000	2483.0000	2867.0000
10140.0000	12420.0000	14220.0000	14260.0000	11320.0000	3311.0000	4049.0000	4608.0000	4584.0000	3721.0000
-.1393	23.2800	288.3000	856.2000	1739.0000	.7824	40.5900	149.9000	349.2000	645.3000
2719.0000	3712.0000	4765.0000	5700.0000	6705.0000	976.8000	1306.0000	1635.0000	1909.0000	2205.0000
7775.0000	9515.0000	10880.0000	10900.0000	8682.0000	2549.0000	3119.0000	3556.0000	3552.0000	2924.0000
-.0683	19.1100	232.0000	688.0000	1396.0000	.5581	27.6900	101.9000	237.3000	438.1000
2182.0000	2977.0000	3820.0000	4567.0000	5370.0000	662.5000	885.2000	1107.0000	1292.0000	1490.0000
6223.0000	7608.0000	8689.0000	8704.0000	6940.0000	1720.0000	2099.0000	2386.0000	2379.0000	1956.0000
.0379	16.4100	189.5000	560.2000	1136.0000	2.9050	29.7500	83.4900	184.4000	336.8000
1773.0000	2418.0000	3100.0000	3706.0000	4356.0000	498.0000	658.3000	826.0000	977.7000	1143.0000
5047.0000	6167.0000	7041.0000	7057.0000	5650.0000	1351.0000	1707.0000	2031.0000	2168.0000	2068.0000
.1042	13.9500	153.8000	453.2000	917.8000	-6.5260	973.4000	2816.0000	5935.0000	10470.0000
1431.0000	1951.0000	2500.0000	2987.0000	3510.0000	15880.0000	21420.0000	26600.0000	30490.0000	34600.0000
4066.0000	4964.0000	5665.0000	5680.0000	4564.0000	39560.0000	47230.0000	51040.0000	46960.0000	34410.0000
.1913	12.1000	123.3000	361.2000	730.3000	-6.7530	1025.0000	2958.0000	6215.0000	10930.0000
1137.0000	1548.0000	1983.0000	2369.0000	2783.0000	16470.0000	22050.0000	27300.0000	31370.0000	35710.0000
3224.0000	3936.0000	4492.0000	4511.0000	3652.0000	41110.0000	49780.0000	55180.0000	52460.0000	40030.0000
.2952	10.7000	96.4200	279.6000	563.8000	-5.4910	849.1000	2448.0000	5134.0000	9012.0000
875.9000	1191.0000	1524.0000	1821.0000	2139.0000	13510.0000	18010.0000	22250.0000	25600.0000	29190.0000
2480.0000	3031.0000	3465.0000	3493.0000	2866.0000	33740.0000	41210.0000	46430.0000	45130.0000	35440.0000
.2112	7.3730	65.6300	190.0000	382.8000	-4.1490	665.7000	1918.0000	4019.0000	7050.0000
594.2000	807.1000	1032.0000	1232.0000	1446.0000	10550.0000	14040.0000	17330.0000	19950.0000	22770.0000
1674.0000	2041.0000	2327.0000	2341.0000	1920.0000	26350.0000	32290.0000	36580.0000	35870.0000	28520.0000
1.1510	14.7400	58.2000	150.6000	295.5000	-3.2110	530.4000	1527.0000	3200.0000	5610.0000
447.5000	600.4000	767.6000	924.7000	1096.0000	8388.0000	11150.0000	13760.0000	15840.0000	18080.0000
1299.0000	1642.0000	1958.0000	2100.0000	1996.0000	20940.0000	25680.0000	29170.0000	28720.0000	22970.0000
-3.5370	526.0000	2105.0000	5008.0000	9387.0000	-2.0410	385.4000	1108.0000	2320.0000	4065.0000
14560.0000	19900.0000	25260.0000	29550.0000	34170.0000	6070.0000	8062.0000	9939.0000	11440.0000	13050.0000
39160.0000	47130.0000	51600.0000	47940.0000	34700.0000	15100.0000	18510.0000	21020.0000	20730.0000	16650.0000
-3.6610	553.8000	2213.0000	5249.0000	9804.0000	-1.1440	274.4000	787.3000	1647.0000	2882.0000
15100.0000	20490.0000	25900.0000	30310.0000	35100.0000	4298.0000	5701.0000	7020.0000	8071.0000	9198.0000
40460.0000	49330.0000	55270.0000	53020.0000	40010.0000	10630.0000	12990.0000	14710.0000	14490.0000	11650.0000
-2.9780	459.1000	1832.0000	4338.0000	8083.0000	-.3717	212.7000	607.8000	1270.0000	2221.0000
12390.0000	16730.0000	21080.0000	24680.0000	28590.0000	3308.0000	4384.0000	5394.0000	6198.0000	7060.0000
33090.0000	40650.0000	46220.0000	45310.0000	35210.0000	8152.0000	9946.0000	11250.0000	11080.0000	8927.0000
-2.2520	360.0000	1436.0000	3396.0000	6324.0000	-.0913	171.2000	488.5000	1020.0000	1783.0000
9676.0000	13050.0000	16420.0000	19230.0000	22280.0000	2654.0000	3515.0000	4323.0000	4966.0000	5653.0000
25810.0000	31790.0000	36340.0000	35920.0000	28270.0000	6524.0000	7951.0000	8980.0000	8839.0000	7132.0000
-1.7440	287.0000	1144.0000	2704.0000	5033.0000	.3702	140.2000	397.9000	829.9000	1450.0000
7694.0000	10370.0000	13040.0000	15260.0000	17680.0000	2156.0000	2854.0000	3509.0000	4030.0000	4587.0000
20500.0000	25270.0000	28940.0000	28720.0000	22740.0000	5292.0000	6445.0000	7277.0000	7169.0000	5809.0000
-1.1140	208.8000	829.9000	1961.0000	3647.0000	.6487	114.0000	322.0000	670.9000	1171.0000
5568.0000	7494.0000	9417.0000	11020.0000	12760.0000	1740.0000	2302.0000	2829.0000	3248.0000	3697.0000
14780.0000	18210.0000	20850.0000	20720.0000	16470.0000	4263.0000	5188.0000	5854.0000	5770.0000	4693.0000
-.6299	148.9000	589.9000	1392.0000	2586.0000	1.0310	91.6700	256.8000	534.0000	931.7000
3944.0000	5301.0000	6653.0000	7778.0000	8995.0000	1382.0000	1826.0000	2244.0000	2577.0000	2933.0000
10410.0000	12780.0000	14600.0000	14490.0000	11540.0000	3382.0000	4115.0000	4644.0000	4587.0000	3759.0000
-.2167	115.8000	455.7000	1074.0000	1993.0000	1.4970	72.0600	198.9000	412.5000	719.0000
3036.0000	4077.0000	5113.0000	5974.0000	6904.0000	1064.0000	1405.0000	1725.0000	1983.0000	2258.0000

Figure C-2-Continued.

2606.0000	3173.0000	3587.0000	3560.0000	2958.0000
1.0680	49.0800	135.3000	280.2000	488.0000
721.7000	951.5000	1168.0000	1341.0000	1525.0000
1758.0000	2134.0000	2406.0000	2382.0000	1978.0000
5.5170	46.1500	108.1000	216.9000	376.4000
545.1000	711.4000	878.9000	1027.0000	1188.0000
1401.0000	1762.0000	2085.0000	2219.0000	2135.0000
-10.7200	1417.0000	3474.0000	6806.0000	11570.0000
16920.0000	22230.0000	27140.0000	30760.0000	34560.0000
39420.0000	46170.0000	48890.0000	44910.0000	33180.0000
-11.1000	1491.0000	3648.0000	7126.0000	12070.0000
17560.0000	22950.0000	27970.0000	31820.0000	35900.0000
41260.0000	49150.0000	53520.0000	50790.0000	39010.0000
-9.0310	1236.0000	3018.0000	5885.0000	9953.0000
14420.0000	18770.0000	22850.0000	26050.0000	29470.0000
34020.0000	40960.0000	45430.0000	44070.0000	34780.0000
-6.8250	968.9000	2364.0000	4607.0000	7786.0000
11260.0000	14640.0000	17820.0000	20330.0000	23020.0000
26620.0000	32170.0000	35920.0000	35150.0000	28080.0000
-5.2830	772.0000	1883.0000	3668.0000	6196.0000
8956.0000	11640.0000	14160.0000	16150.0000	18300.0000
21170.0000	25620.0000	28690.0000	28190.0000	22650.0000
-3.3610	560.7000	1366.0000	2659.0000	4488.0000
6480.0000	8412.0000	10230.0000	11670.0000	13210.0000
15270.0000	18470.0000	20690.0000	20360.0000	16420.0000
-1.8860	399.0000	970.4000	1887.0000	3182.0000
4587.0000	5947.0000	7222.0000	8230.0000	9310.0000
10750.0000	12960.0000	14480.0000	14230.0000	11490.0000
-.6189	308.8000	749.0000	1455.0000	2451.0000
3531.0000	4573.0000	5550.0000	6321.0000	7146.0000
8243.0000	9925.0000	11070.0000	10880.0000	8804.0000
-.1578	248.6000	601.9000	1169.0000	1968.0000
2832.0000	3667.0000	4447.0000	5064.0000	5722.0000
6596.0000	7933.0000	8835.0000	8679.0000	7033.0000
.5992	203.2000	490.2000	950.8000	1600.0000
2301.0000	2977.0000	3610.0000	4111.0000	4644.0000
5352.0000	6433.0000	7163.0000	7042.0000	5732.0000
1.0570	165.0000	396.7000	768.6000	1293.0000
1858.0000	2402.0000	2911.0000	3314.0000	3744.0000
4312.0000	5179.0000	5764.0000	5670.0000	4634.0000
1.6840	132.4000	316.2000	611.9000	1028.0000
1476.0000	1907.0000	2311.0000	2631.0000	2972.0000
3423.0000	4111.0000	4576.0000	4513.0000	3717.0000
2.4470	103.6000	244.9000	472.7000	793.9000
1137.0000	1468.0000	1778.0000	2026.0000	2290.0000
2640.0000	3174.0000	3542.0000	3510.0000	2934.0000
1.7450	70.5300	166.5000	321.0000	538.7000
770.9000	994.0000	1203.0000	1370.0000	1547.0000
1780.0000	2134.0000	2374.0000	2347.0000	1960.0000
9.0290	63.4800	132.6000	249.4000	417.6000
588.4000	753.7000	920.3000	1068.0000	1228.0000
1446.0000	1801.0000	2116.0000	2255.0000	2186.0000

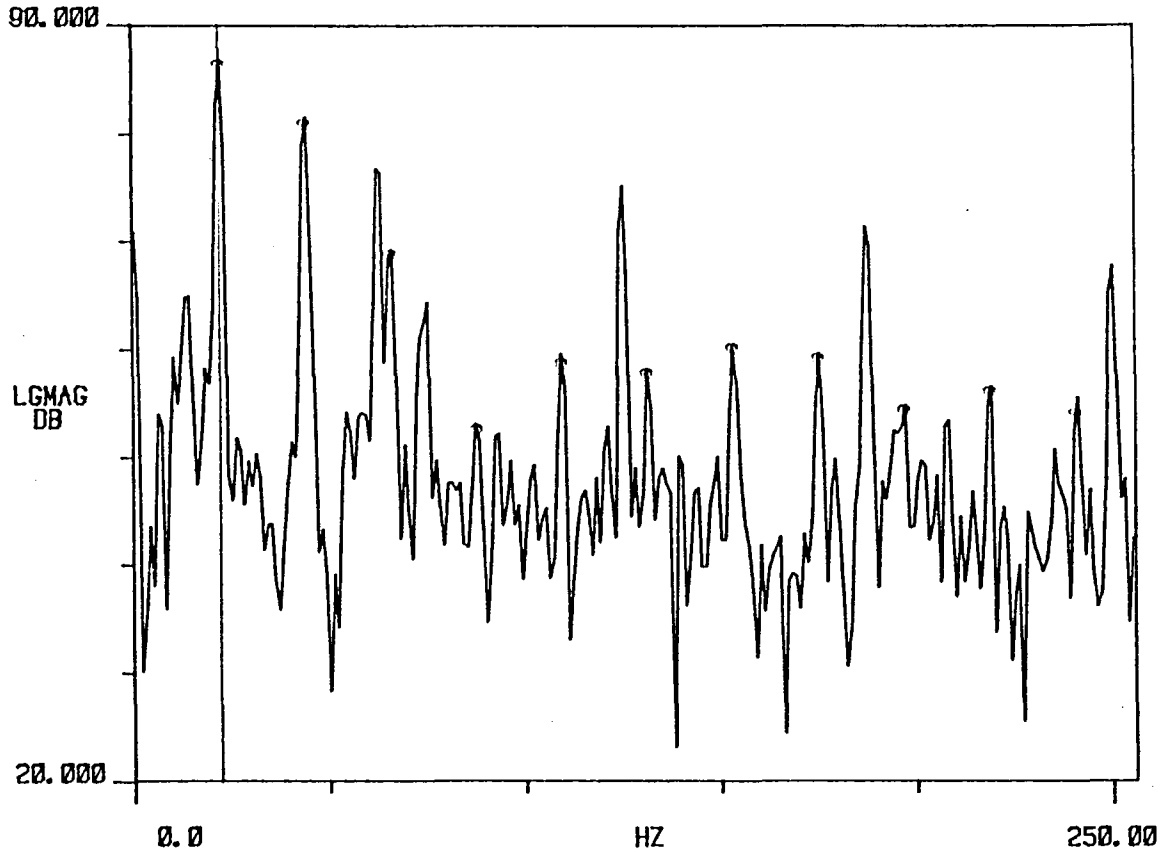
Figure C-2-Concluded.

APPENDIX D
MEASURED ACOUSTIC DATA PLOTS



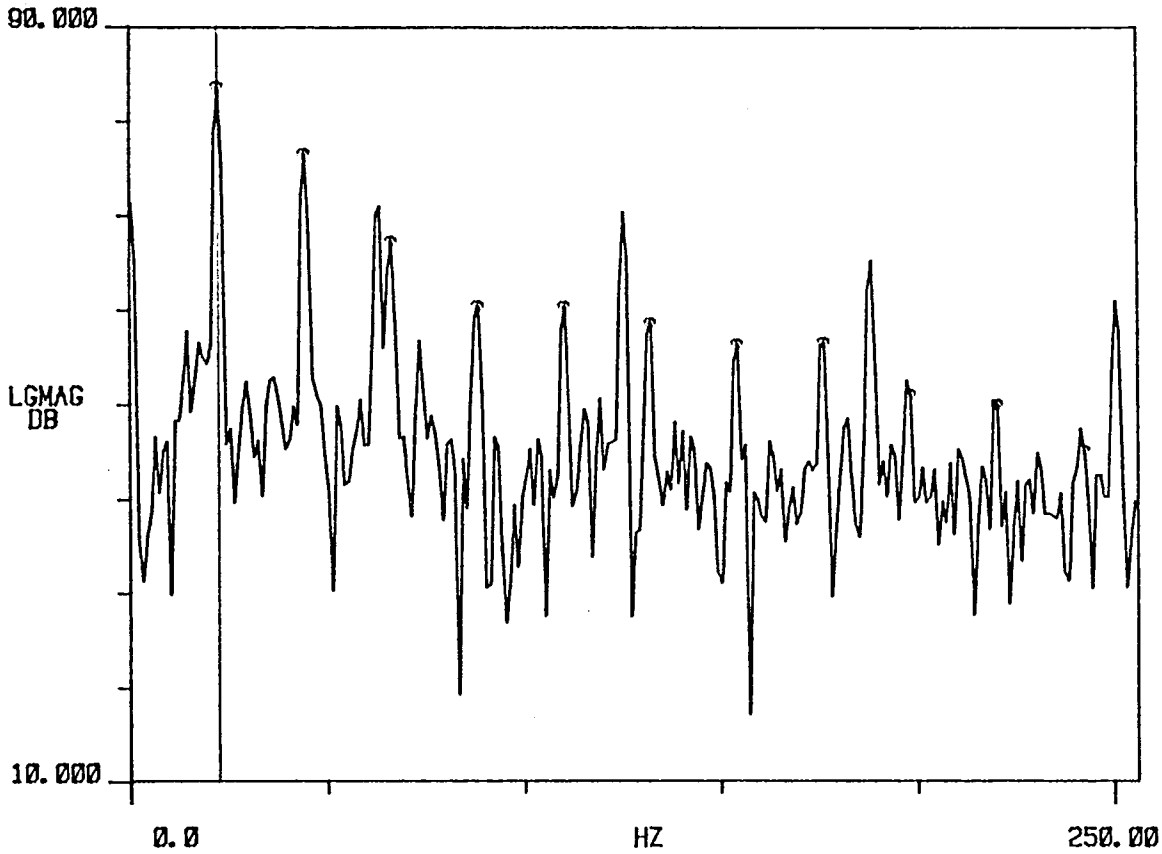
HARMONIC FREQUENCY (HZ)	HARMONIC AMPLITUDE (DB)	HARMONIC PHASE ANGLE (DEG)
22.0000 E+0	89.6243 E+0	1.62323 E+0
43.0000 E+0	79.0216 E+0	-57.3294 E+0
65.0000 E+0	70.9003 E+0	-5.12512 E+0
87.0000 E+0	73.1351 E+0	62.4751 E+0
109.000 E+0	70.5487 E+0	-136.133 E+0
130.000 E+0	67.5952 E+0	176.417 E+0
152.000 E+0	61.9028 E+0	-21.6046 E+0
174.000 E+0	52.7478 E+0	162.990 E+0
195.000 E+0	50.0983 E+0	-169.014 E+0
217.000 E+0	50.6747 E+0	19.6394 E+0
239.000 E+0	51.8976 E+0	-152.475 E+0

Figure D-1(a) -Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.



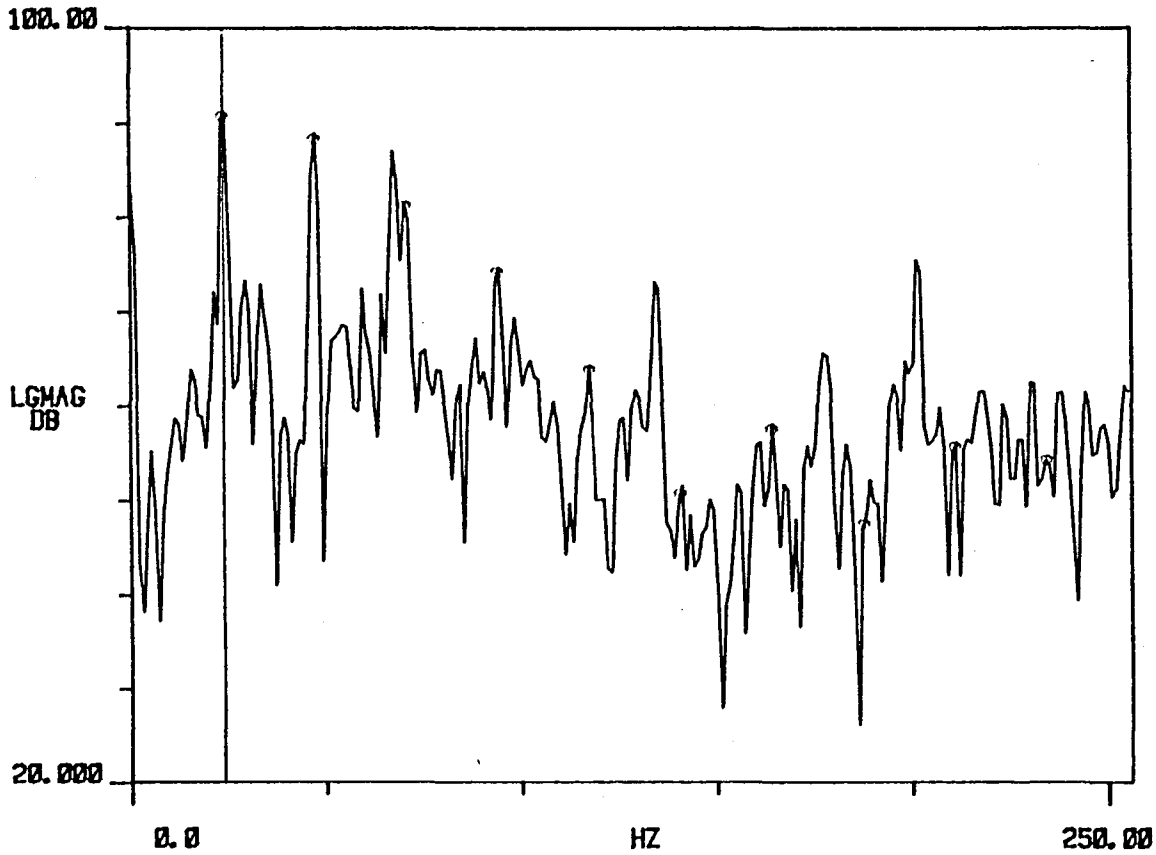
22.0000 E+0	86.7868 E+0	-39.4478 E+0
44.0000 E+0	81.5298 E+0	24.1411 E+0
66.0000 E+0	69.0311 E+0	68.0589 E+0
87.0000 E+0	53.1808 E+0	-56.1827 E+0
109.000 E+0	59.6121 E+0	-51.5492 E+0
131.000 E+0	58.2309 E+0	11.3695 E+0
153.000 E+0	60.0720 E+0	109.443 E+0
175.000 E+0	59.7070 E+0	-151.276 E+0
197.000 E+0	54.8907 E+0	-65.1132 E+0
219.000 E+0	56.6614 E+0	21.4247 E+0
240.000 E+0	52.7219 E+0	-80.6987 E+0

Figure D-1(b) - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.



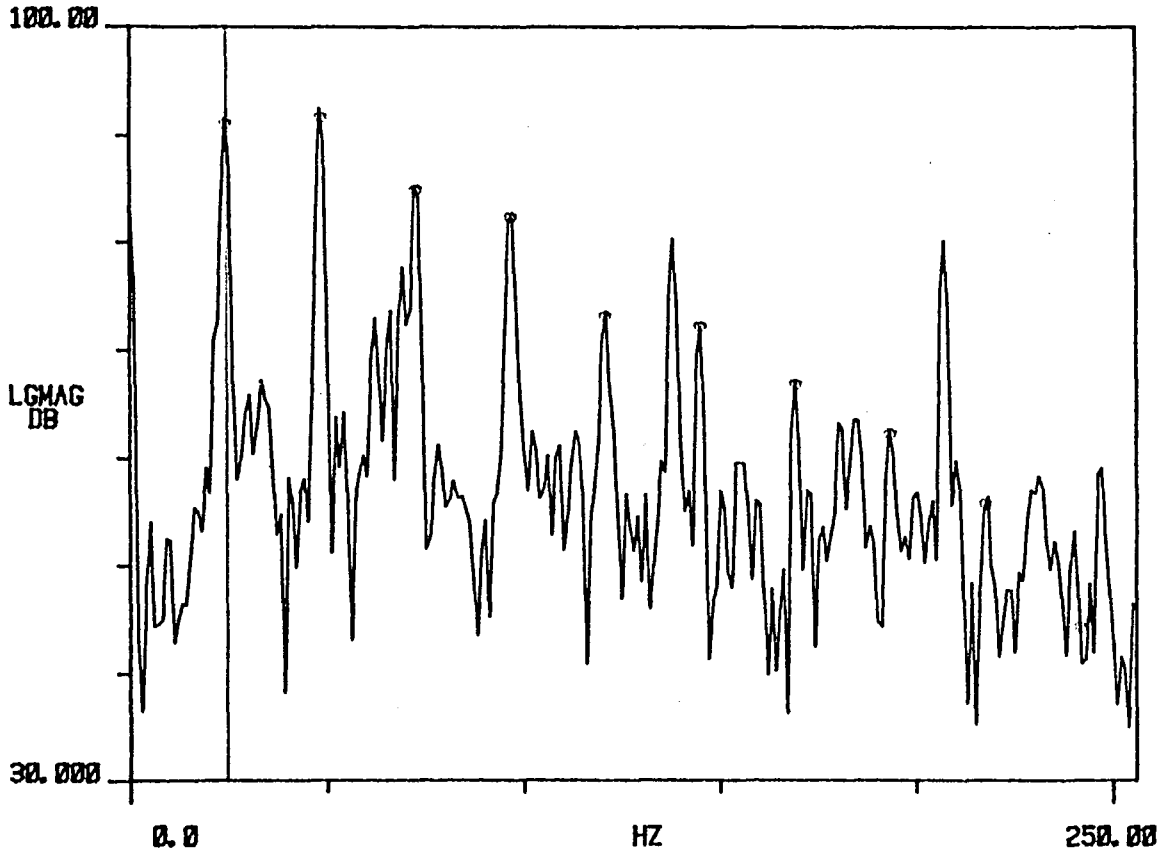
22.0000 E+0	83.5190 E+0	85.6659 E+0
44.0000 E+0	76.4337 E+0	-66.6005 E+0
66.0000 E+0	67.1088 E+0	94.2407 E+0
88.0000 E+0	60.2954 E+0	-96.0081 E+0
110.000 E+0	60.2393 E+0	65.4222 E+0
132.000 E+0	58.4714 E+0	-98.5913 E+0
154.000 E+0	56.2488 E+0	116.851 E+0
176.000 E+0	56.4343 E+0	-14.9661 E+0
198.000 E+0	50.9985 E+0	-173.371 E+0
220.000 E+0	49.9423 E+0	40.3363 E+0
242.000 E+0	45.0201 E+0	-83.077[illegible] E+0

Figure D-1(c) - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.



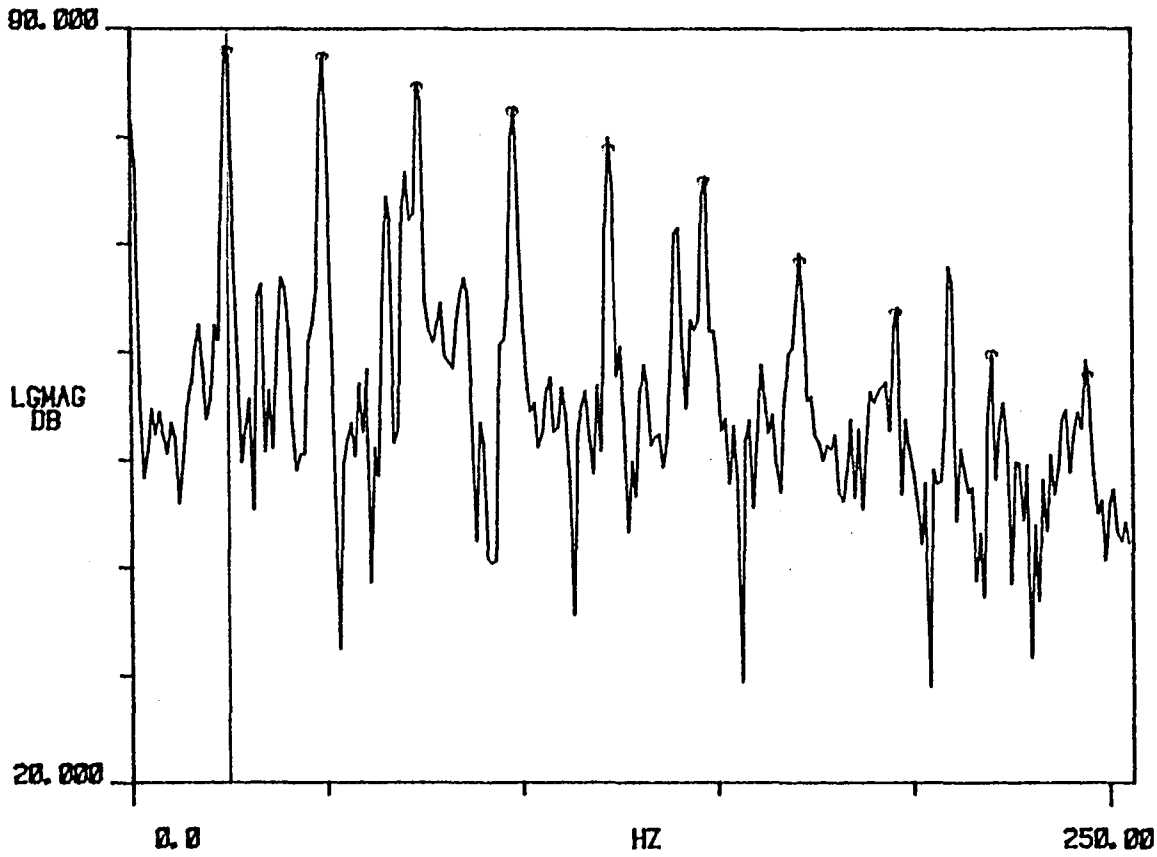
23.0000 E+0	90.3348	-32.2614
47.0000 E+0	88.8712	155.240
70.0000 E+0	81.3885	169.137
94.0000 E+0	74.6457	-10.4851
117.000 E+0	63.9584	-16.9807
140.000 E+0	40.5795	-22.2047
164.000 E+0	58.0600	-90.7114
187.000 E+0	46.8265	-163.058
211.000 E+0	55.7614	82.6131
234.000 E+0	54.2319	

Figure D-2(a) - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 82.3m/sec (160kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 304.8m (1000 ft.) ahead of helicopter.



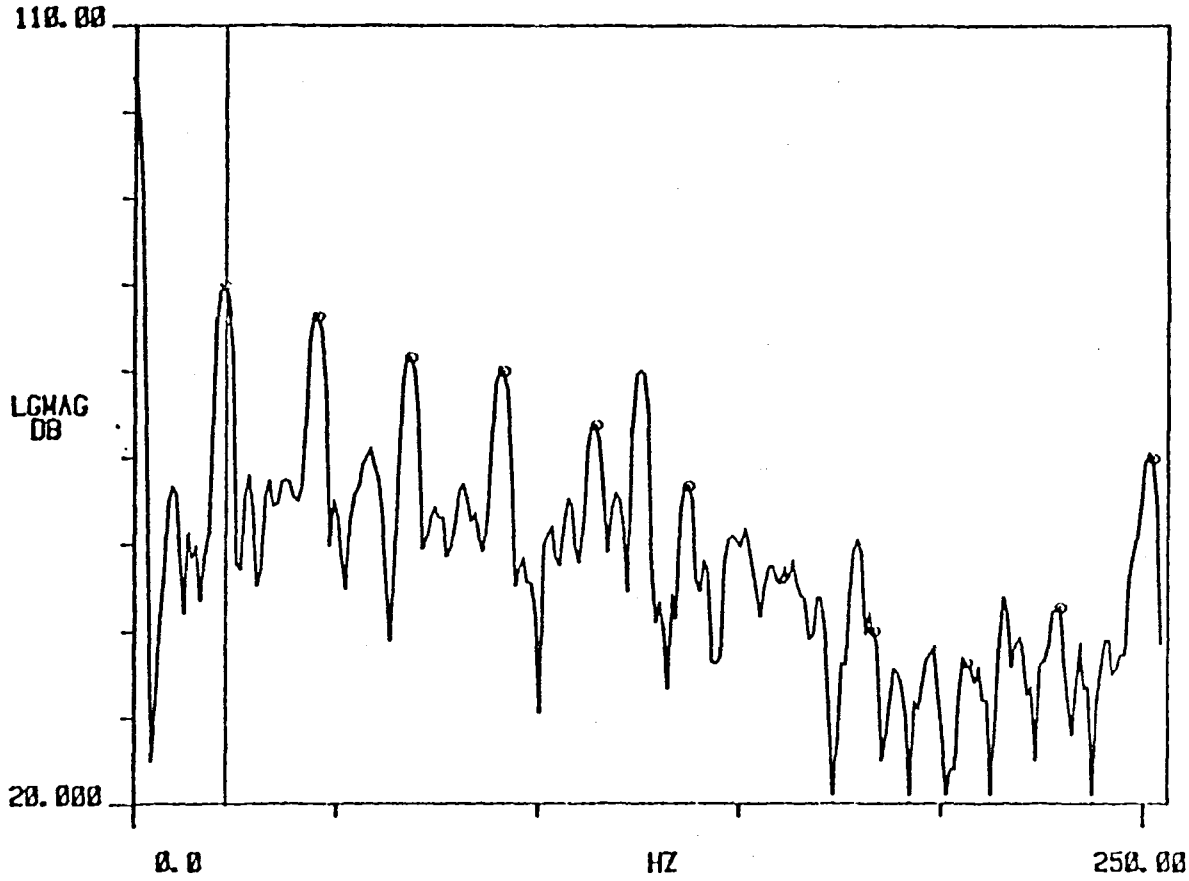
24.0000 E+0	91.4685	14.7231
48.0000 E+0	92.3779	108.170
72.0000 E+0	84.9686	-151.423
97.0000 E+0	82.0816	150.585
121.000 E+0	73.5031	-92.4898
145.000 E+0	71.9946	24.7289
169.000 E+0	67.1204	137.038
193.000 E+0	62.6114	-131.866
217.000 E+0	55.0446	-19.8303
242.000 E+0	48.8371	

Figure D-2(b) - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.



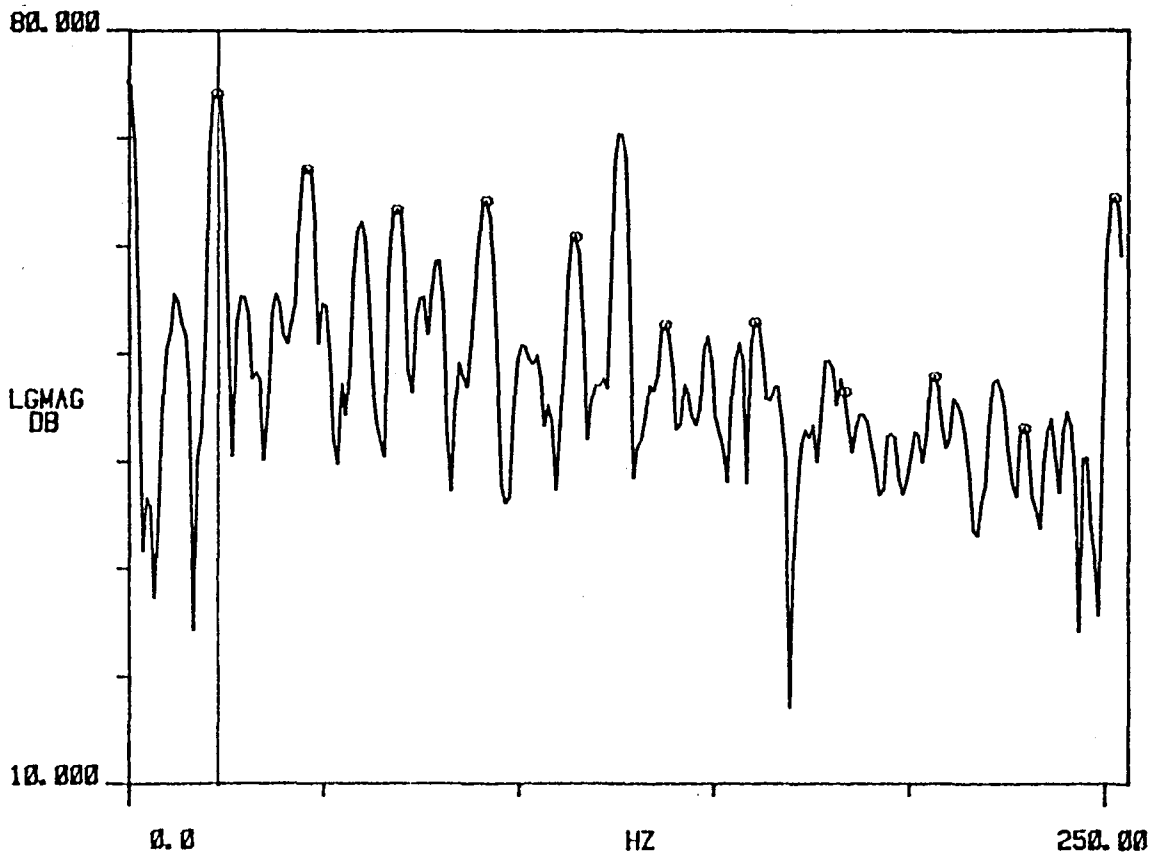
24.0000 E+0	88.3160 E+0	-71.6995 E+0
49.0000 E+0	87.5619 E+0	83.3752 E+0
73.0000 E+0	84.9268 E+0	93.3206 E+0
98.0000 E+0	82.6413 E+0	-66.7653 E+0
122.000 E+0	79.8709 E+0	-55.0662 E+0
147.000 E+0	76.0358 E+0	129.275 E+0
171.000 E+0	69.1519 E+0	113.754 E+0
196.000 E+0	64.1318 E+0	-43.8753 E+0
220.000 E+0	59.5963 E+0	-35.5174 E+0
245.000 E+0	56.1649 E+0	160.961 E+0

Figure D-2(c) - Typical processed experimental total (main and tail rotor) acoustic pressure data for CH-53A helicopter. V = 8.23m/sec (160 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.



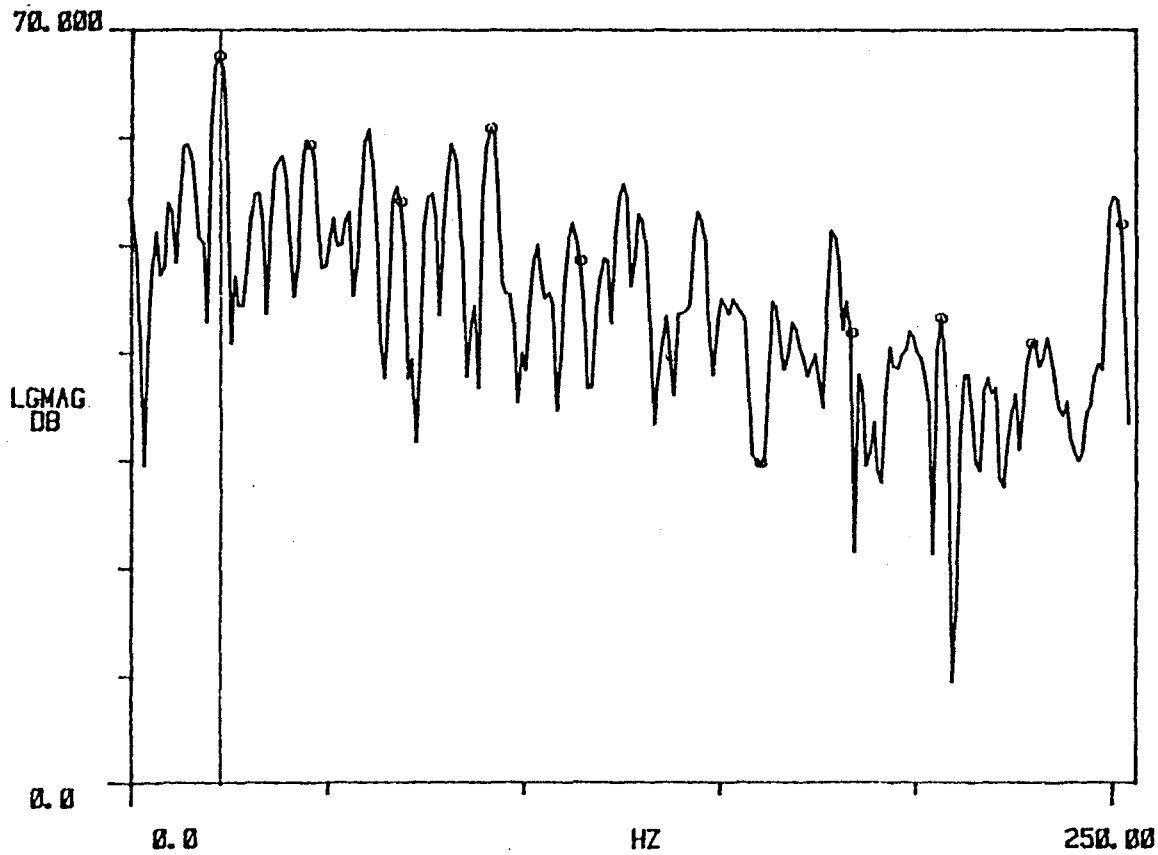
HARMONIC FREQUENCY (HZ)	HARMONIC AMPLITUDE (DB)	HARMONIC PHASE ANGLE (DEG)
23.0000 E+0	79.7220 E+0	98.0585 E+0
46.0000 E+0	76.0880 E+0	-121.708 E+0
69.0000 E+0	71.3721 E+0	35.0491 E+0
92.0000 E+0	69.6548 E+0	-149.075 E+0
115.000 E+0	63.4930 E+0	55.4631 E+0
138.000 E+0	56.5198 E+0	-123.294 E+0
161.000 E+0	45.9335 E+0	46.6425 E+0
184.000 E+0	39.9854 E+0	-165.964 E+0
207.000 E+0	36.1865 E+0	-172.875 E+0
230.000 E+0	42.6694 E+0	61.9464 E+0
253.000 E+0	59.7910 E+0	-71.8739 E+0

Figure D-3(a)-Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of heliçopter.



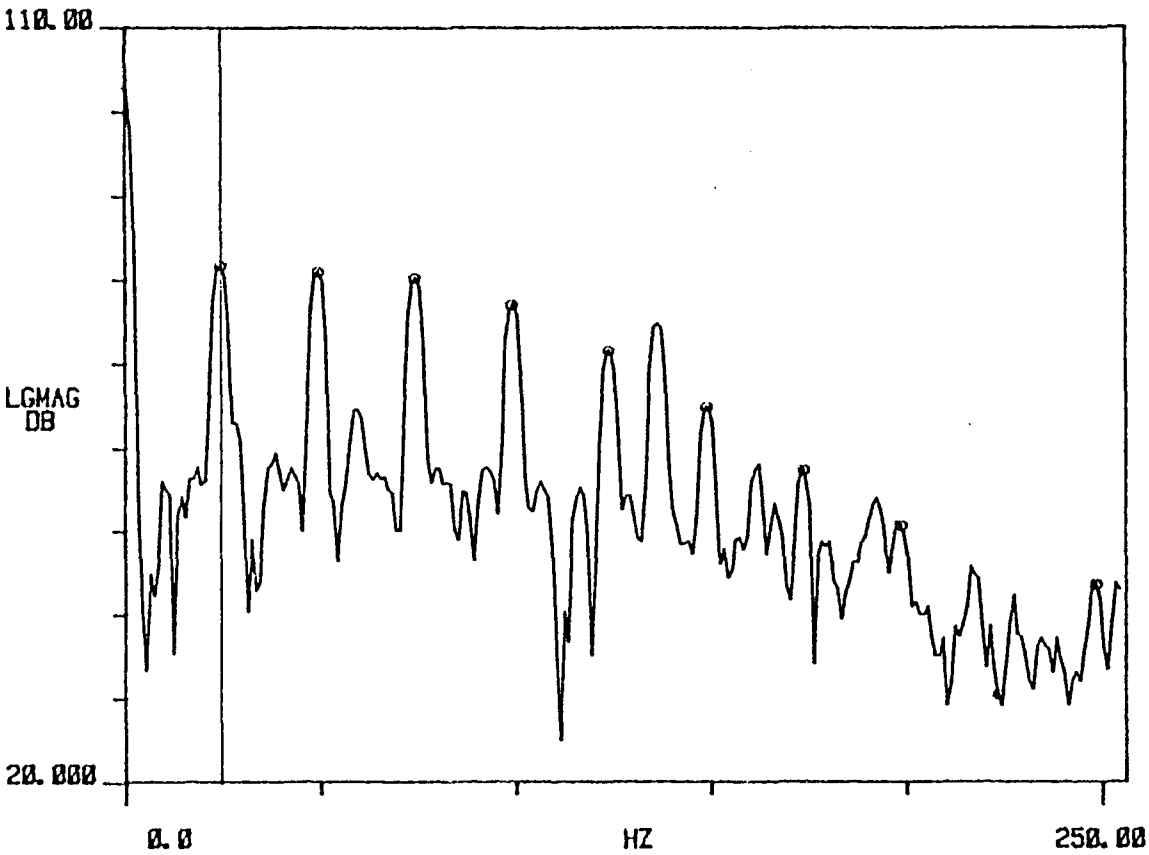
23.0000 E+0	74.0530 E+0	41.2070 E+0
46.0000 E+0	66.9943 E+0	125.416 E+0
69.0000 E+0	63.2132 E+0	-108.589 E+0
92.0000 E+0	64.0439 E+0	-24.8634 E+0
115.000 E+0	60.7678 E+0	-158.866 E+0
138.000 E+0	52.5708 E+0	-87.8494 E+0
161.000 E+0	52.7783 E+0	86.5146 E+0
184.000 E+0	46.4145 E+0	155.683 E+0
207.000 E+0	47.7841 E+0	-74.5738 E+0
230.000 E+0	43.0200 E+0	53.7726 E+0
253.000 E+0	64.4043 E+0	27.4507 E+0

Figure D-3(b) - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.



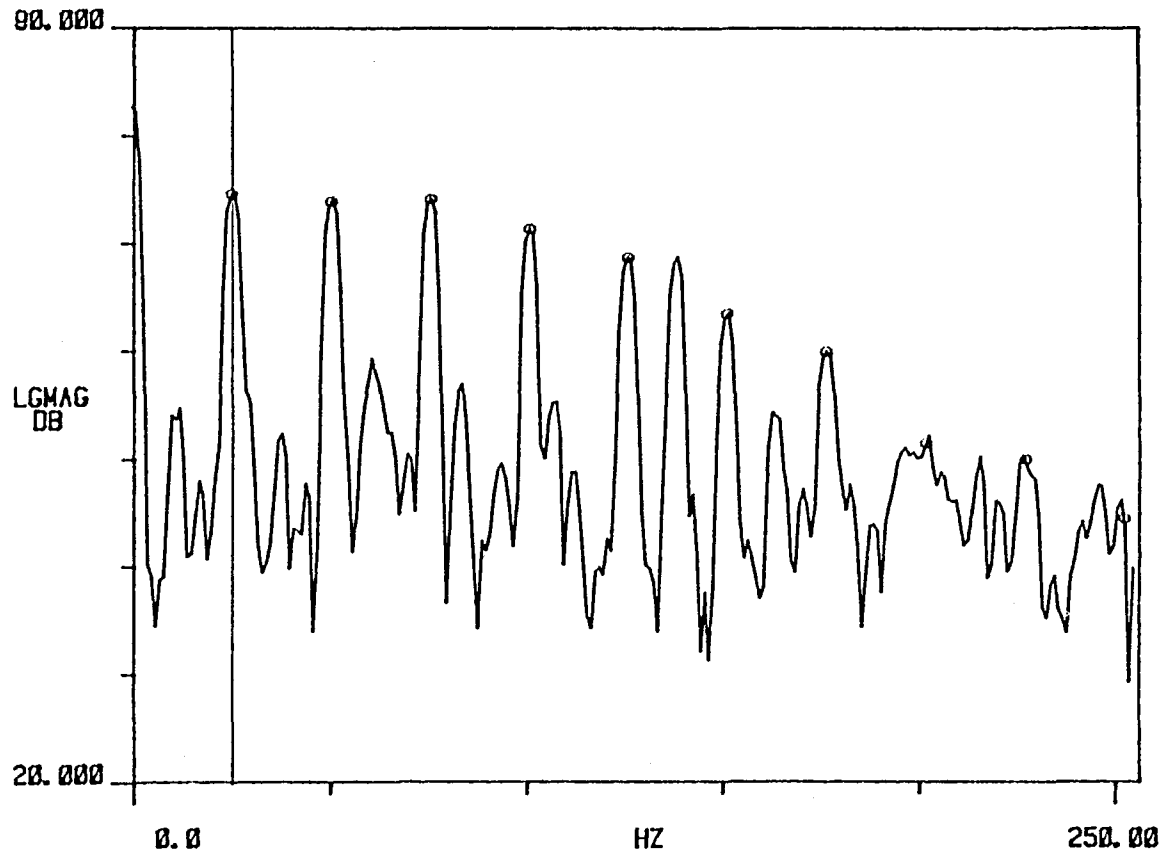
23.0000 E+0	67.5345 E+0	1.81549 E+0
46.0000 E+0	59.2221 E+0	111.903 E+0
69.0000 E+0	53.9398 E+0	-150.462 E+0
92.0000 E+0	60.7513 E+0	-117.519 E+0
115.000 E+0	48.4802 E+0	106.246 E+0
138.000 E+0	39.5306 E+0	-96.7360 E+0
161.000 E+0	29.6692 E+0	11.1195 E+0
184.000 E+0	41.7676 E+0	62.7704 E+0
207.000 E+0	43.1320 E+0	-74.7070 E+0
230.000 E+0	40.7904 E+0	-14.1270 E+0
253.000 E+0	51.9226 E+0	131.026 E+0

Figure D-3(c) - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 1219.2m (1000 ft.) ahead of helicopter.



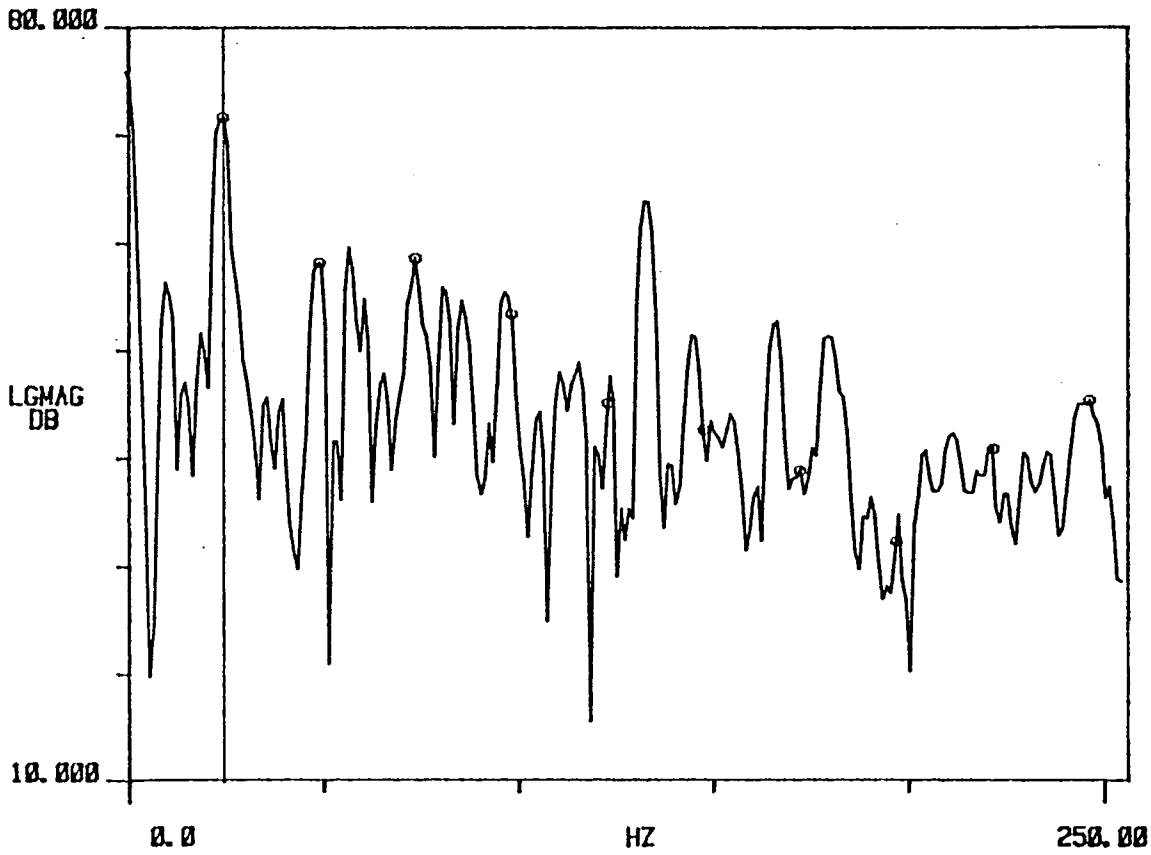
25.0000 E+0	81.4899 E+0	154.436 E+0
50.0000 E+0	80.6723 E+0	-29.9103 E+0
75.0000 E+0	80.0272 E+0	129.489 E+0
100.000 E+0	76.8304 E+0	-38.1981 E+0
124.000 E+0	71.3422 E+0	-9.59518 E+0
149.000 E+0	64.5078 E+0	-150.032 E+0
174.000 E+0	57.4420 E+0	75.0792 E+0
199.000 E+0	50.4974 E+0	-49.8587 E+0
224.000 E+0	30.3816 E+0	75.9636 E+0
249.000 E+0	43.3466 E+0	-44.9986 E+0

Figure D-4(a) - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 72.02m/sec (140 kt). Helicopter altitude = 15.4m (500 ft.). Observer fixed to ground 304.8m (1000 ft.) ahead of helicopter.



25.0000 E+0	74.3799 E+0	88.4830 E+0
51.0000 E+0	73.9316 E+0	51.8445 E+0
76.0000 E+0	74.0109 E+0	-156.606 E+0
101.000 E+0	71.1954 E+0	20.0212 E+0
126.000 E+0	68.5315 E+0	-166.645 E+0
152.000 E+0	63.4875 E+0	176.262 E+0
177.000 E+0	58.8578 E+0	6.35422 E+0
202.000 E+0	51.2579 E+0	-172.463 E+0
227.000 E+0	50.3726 E+0	44.4960 E+0
253.000 E+0	43.4360 E+0	-28.9668 E+0

Figure D-4(b) - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 72.02m/sec (140 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.



25.0000 E+0	71.5883 E+0	-62.2705 E+0
49.0000 E+0	58.0447 E+0	-148.688 E+0
74.0000 E+0	58.5446 E+0	110.143 E+0
99.0000 E+0	52.5348 E+0	-154.193 E+0
123.000 E+0	43.4439 E+0	86.7288 E+0
148.000 E+0	42.7072 E+0	-24.2990 E+0
173.000 E+0	38.9413 E+0	-32.9974 E+0
197.000 E+0	30.6705 E+0	-131.725 E+0
222.000 E+0	41.1639 E+0	57.7744 E+0
247.000 E+0	45.3119 E+0	105.396 E+0

Figure D-4(c) - Typical processed experimental total (main and tail rotor) acoustic pressure data for S-76 helicopter. V = 72.02m/sec (140 kt). Helicopter altitude = 15.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.

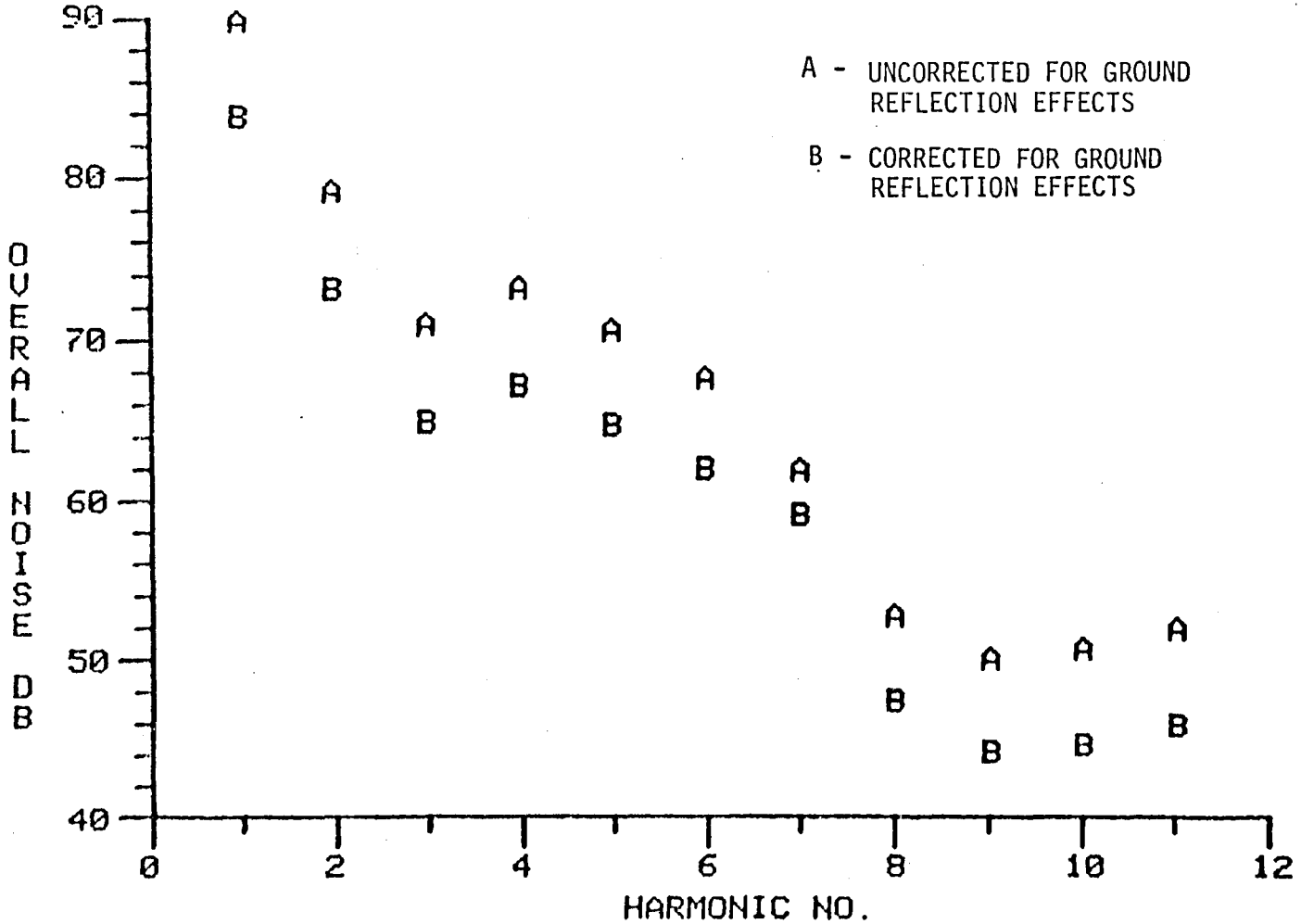


Figure D-5(a) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 304.8m (100 ft) ahead of helicopter.

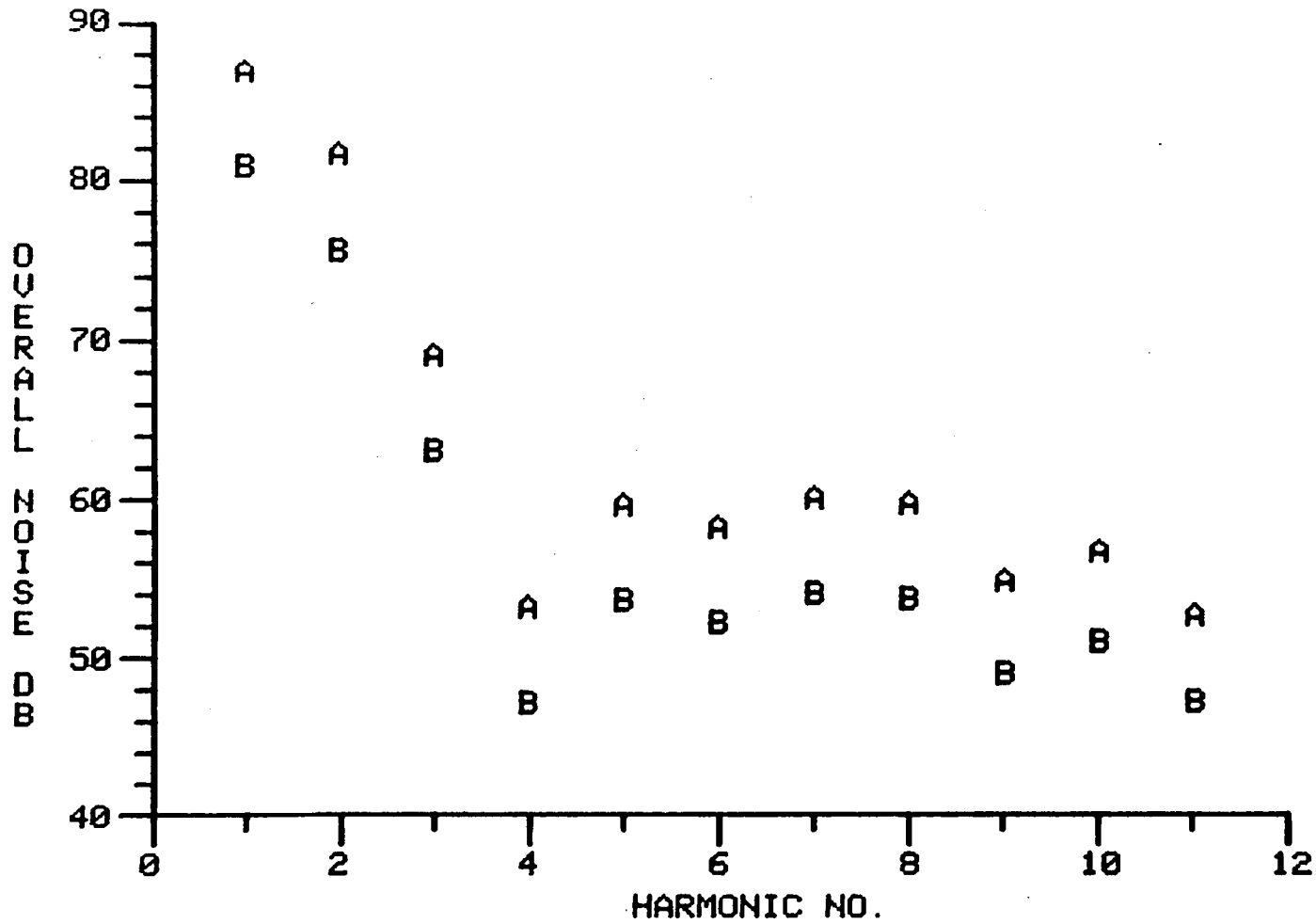


Figure D-5(b) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.

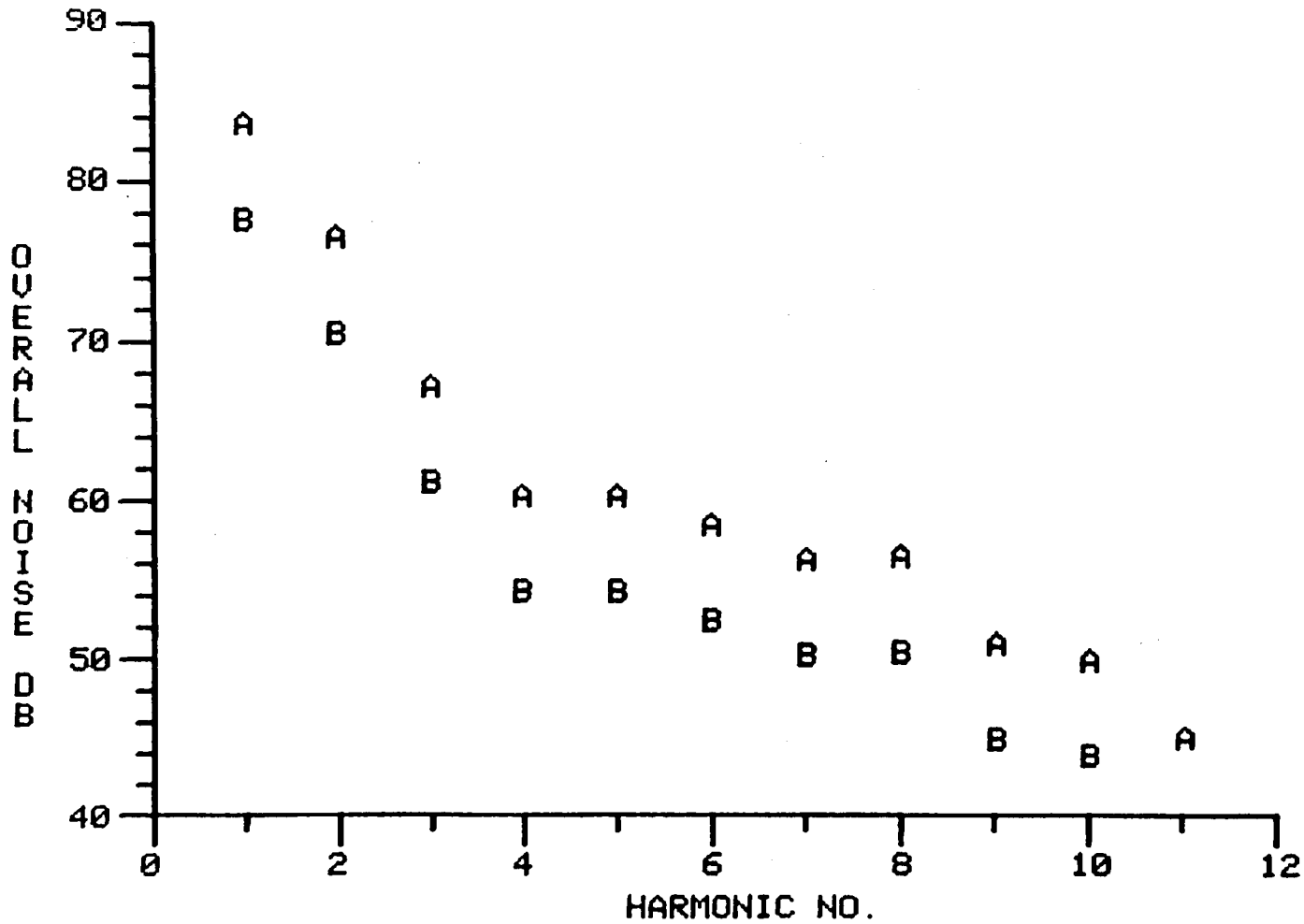


Figure D-5(c) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.

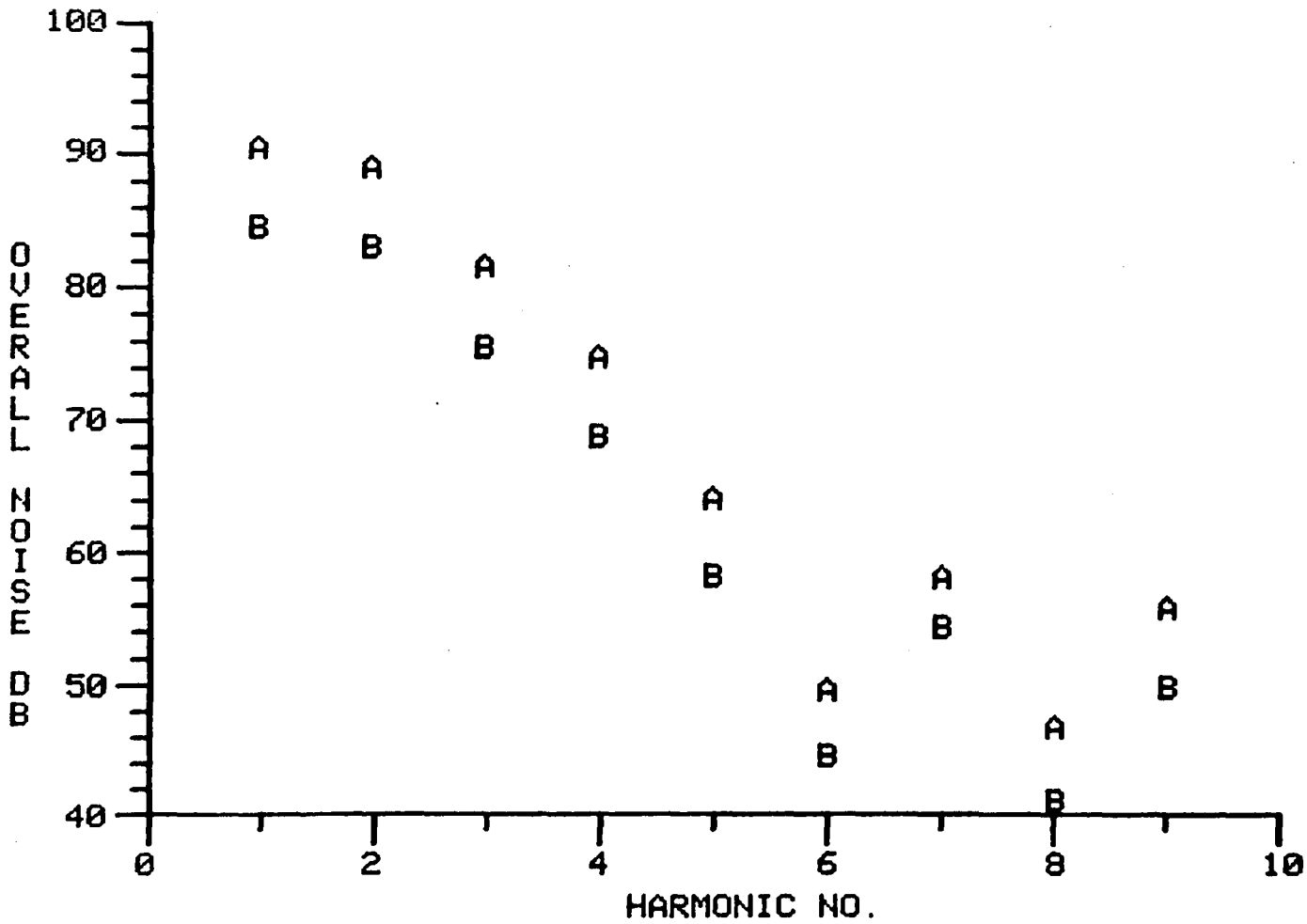


Figure D-6(a) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude - 152.4m (500 ft.). Observer fixed to ground 304.8m (100 ft.) ahead of helicopter.

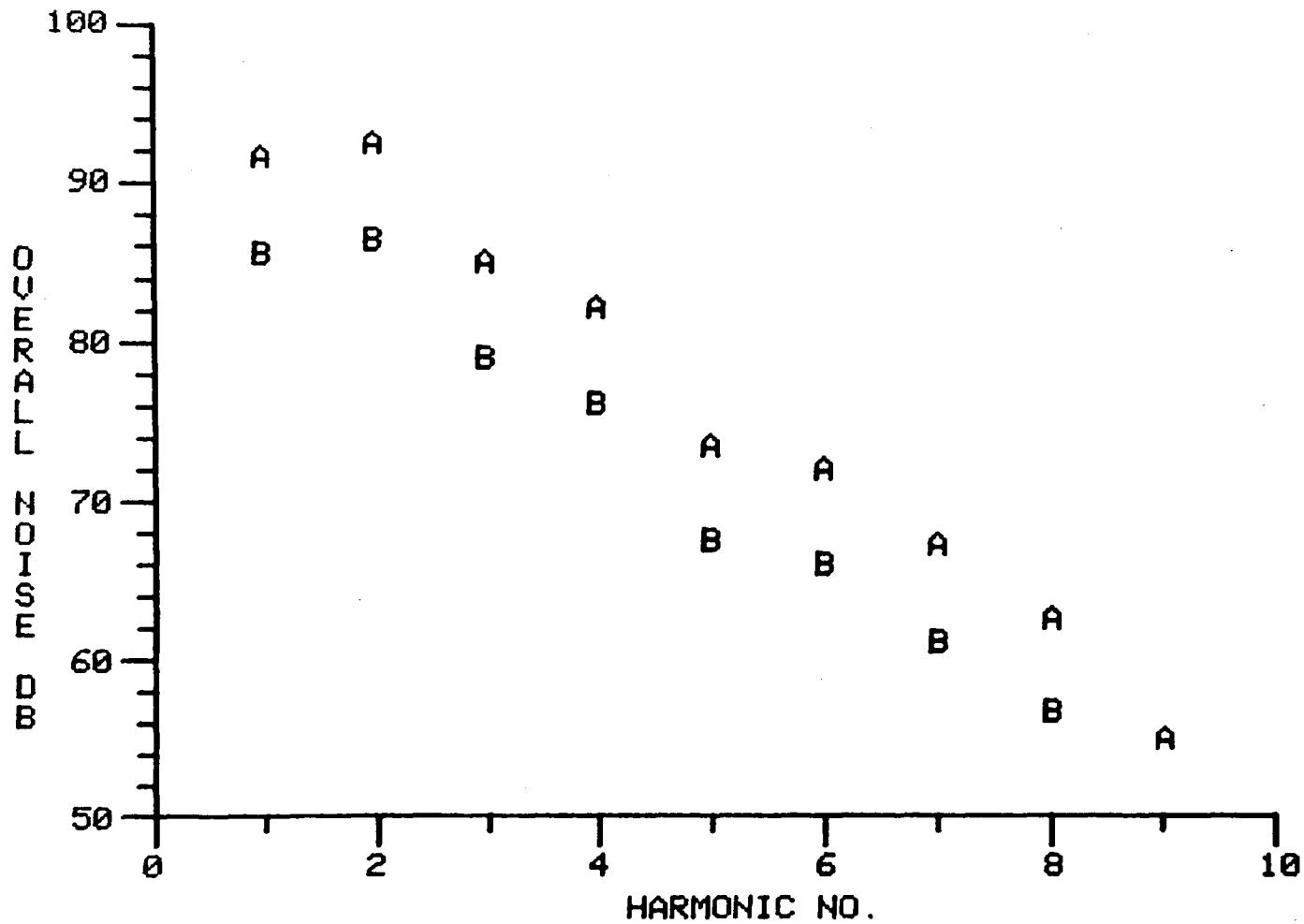


Figure D-6(b) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.

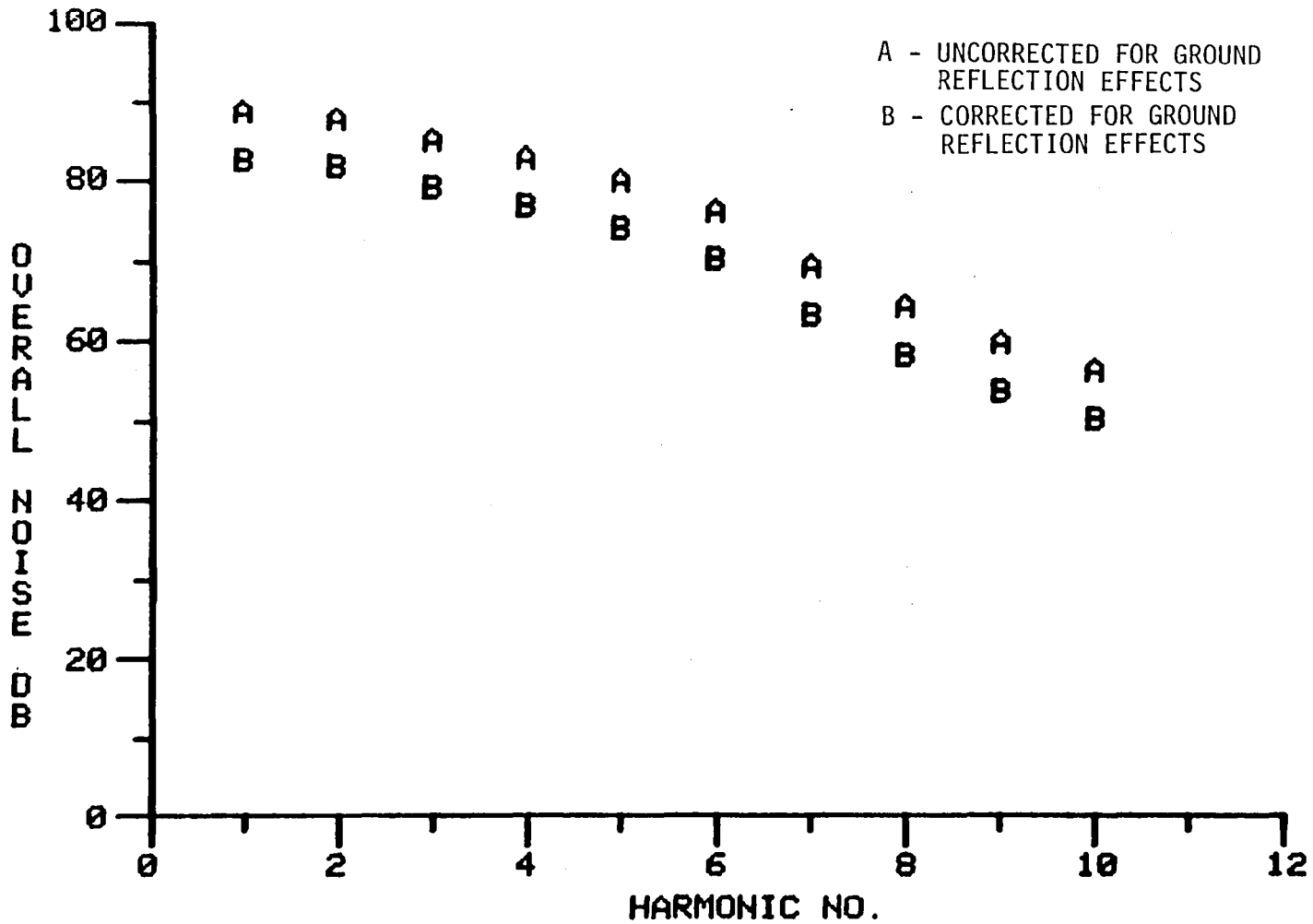


Figure D-6(c) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter.

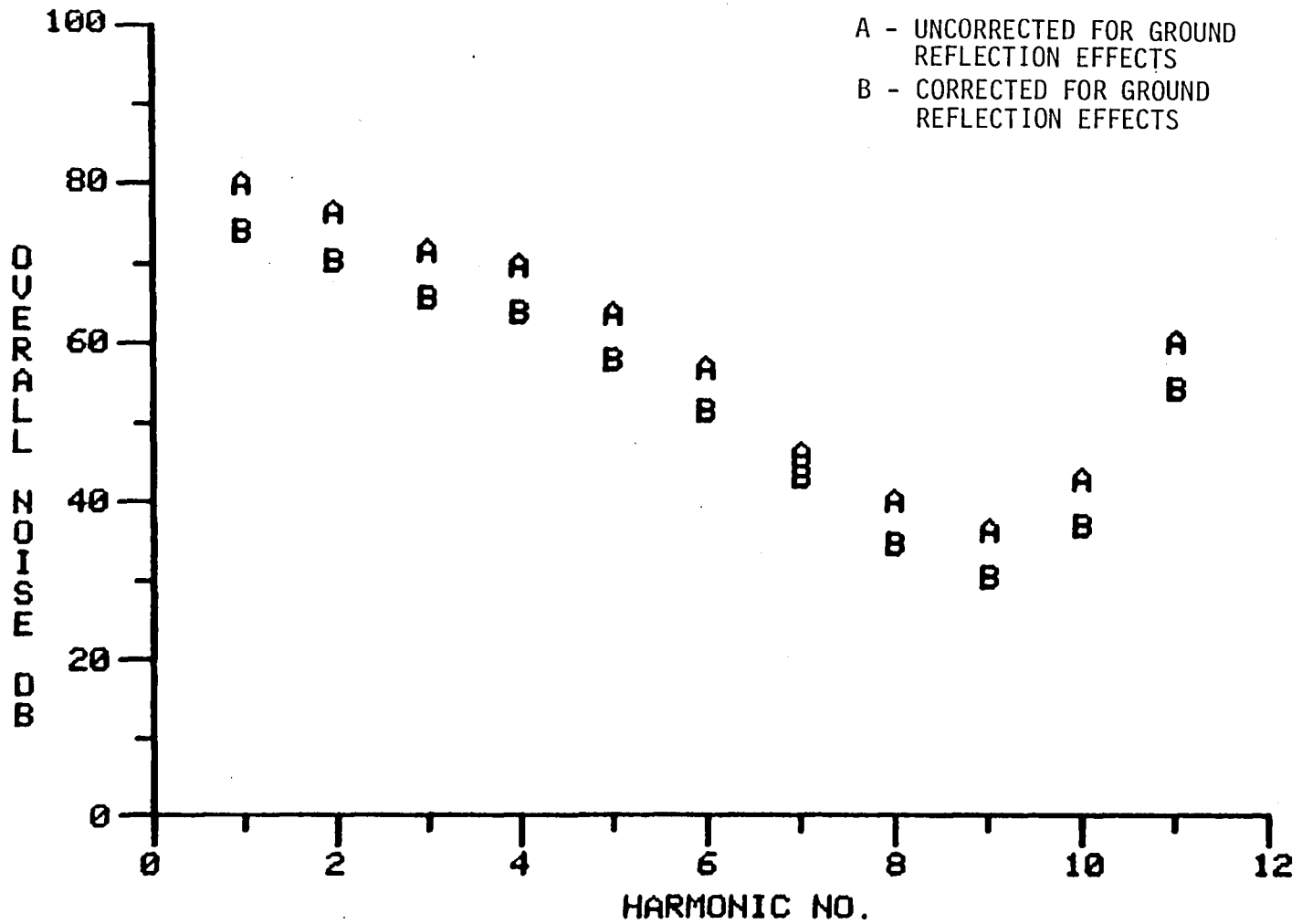


Figure D-7(a) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

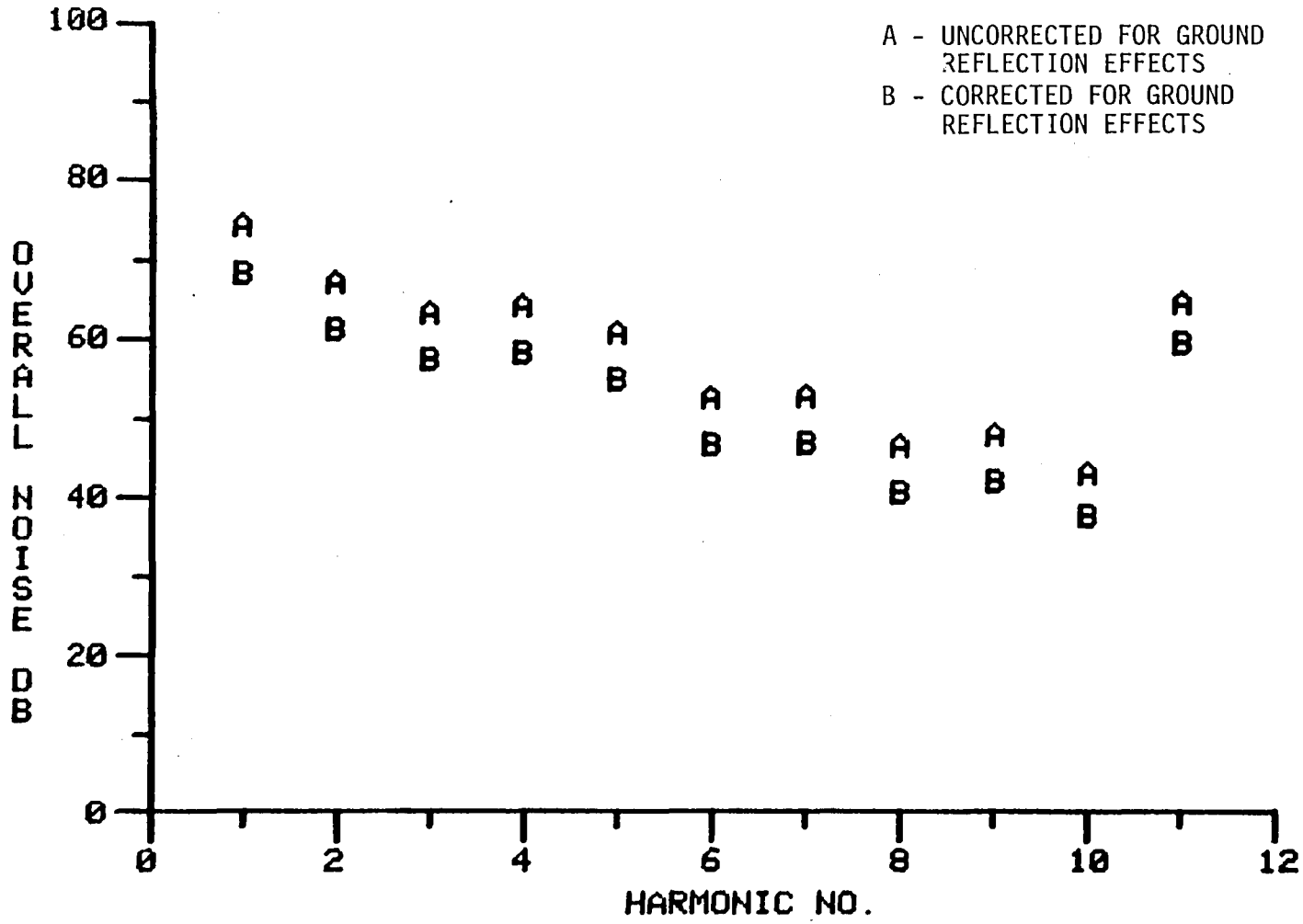


Figure D-7(b) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

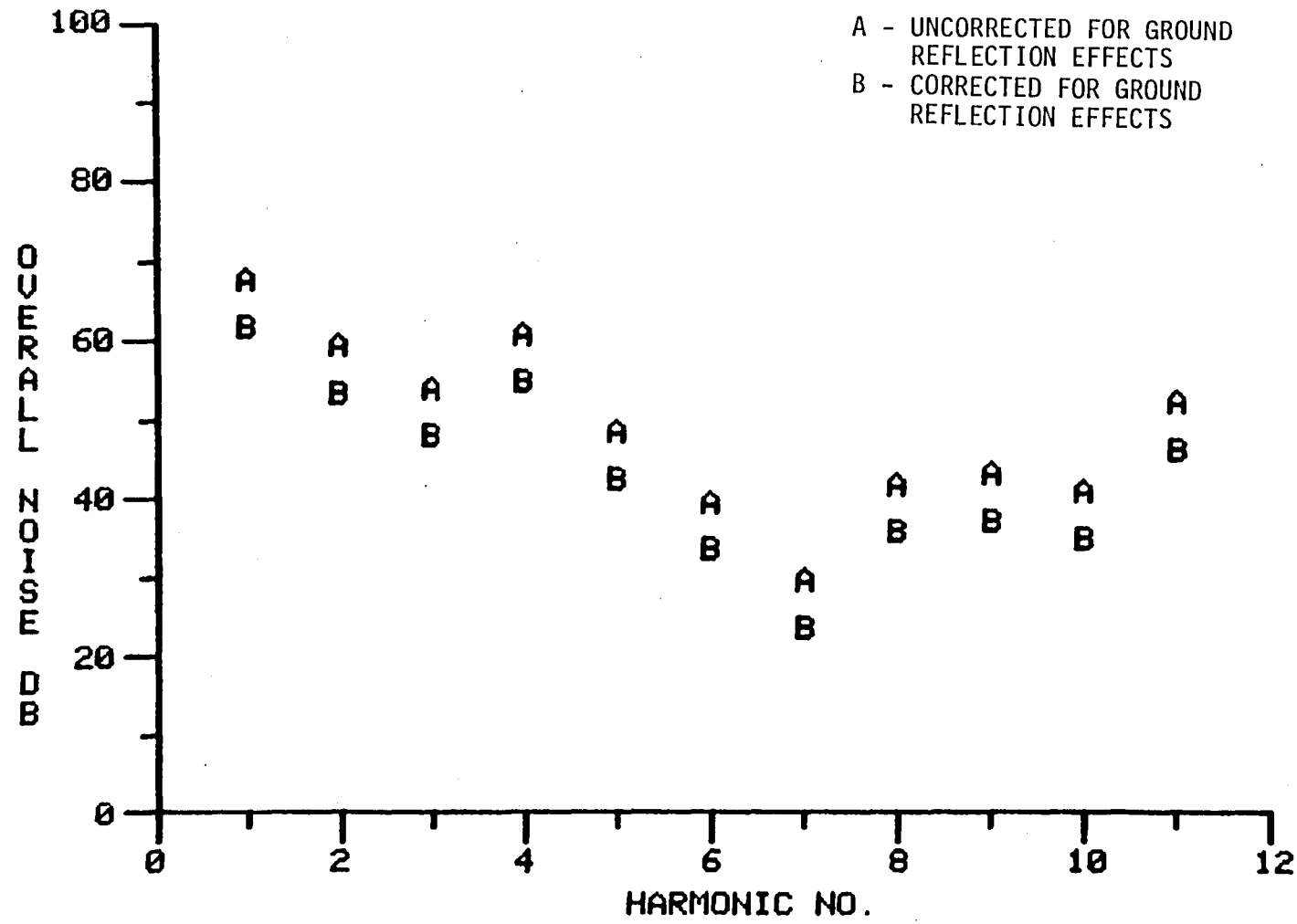


Figure D-7(c) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter.

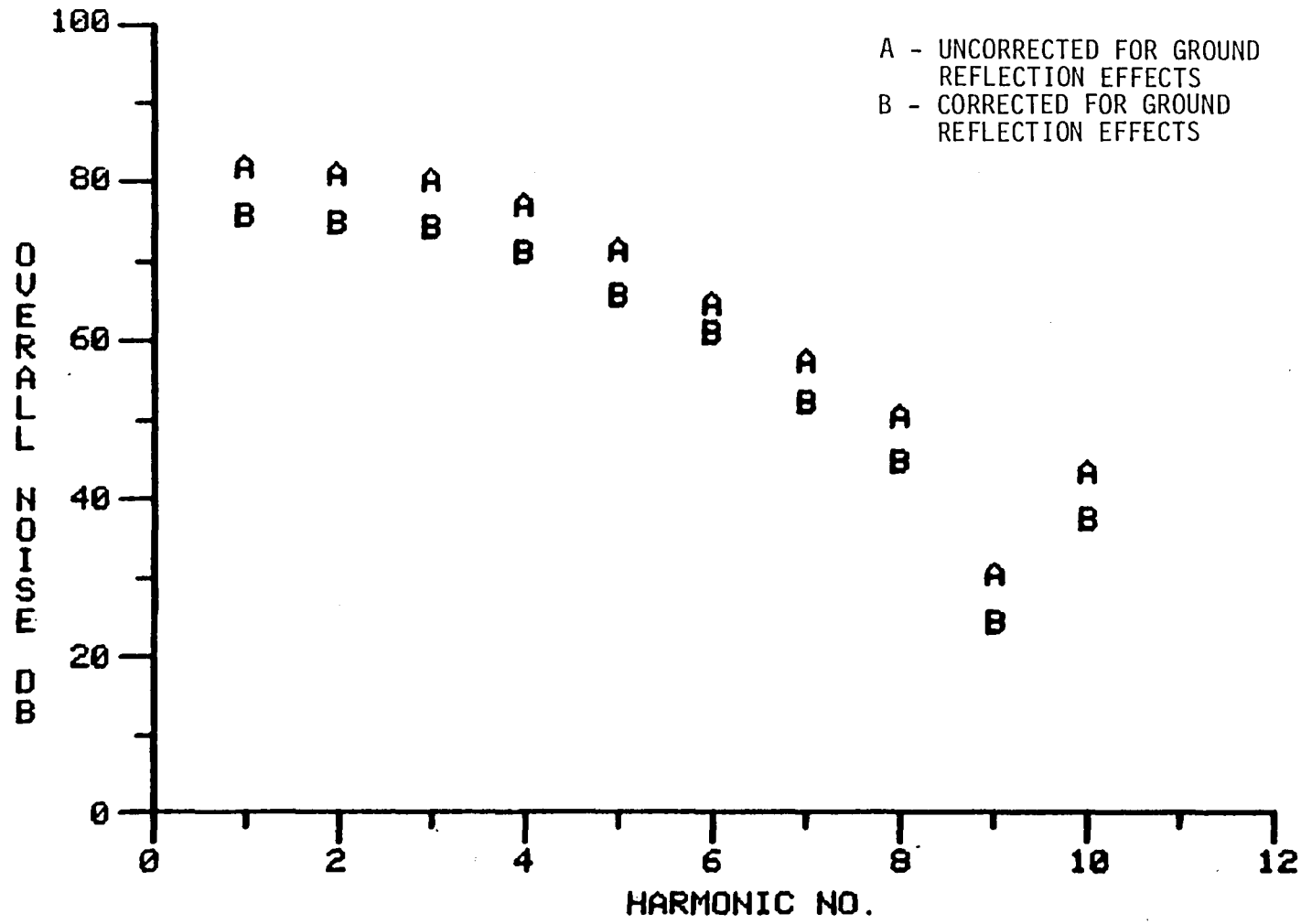


Figure D-8(a) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction V = 72.02m/sec (140 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

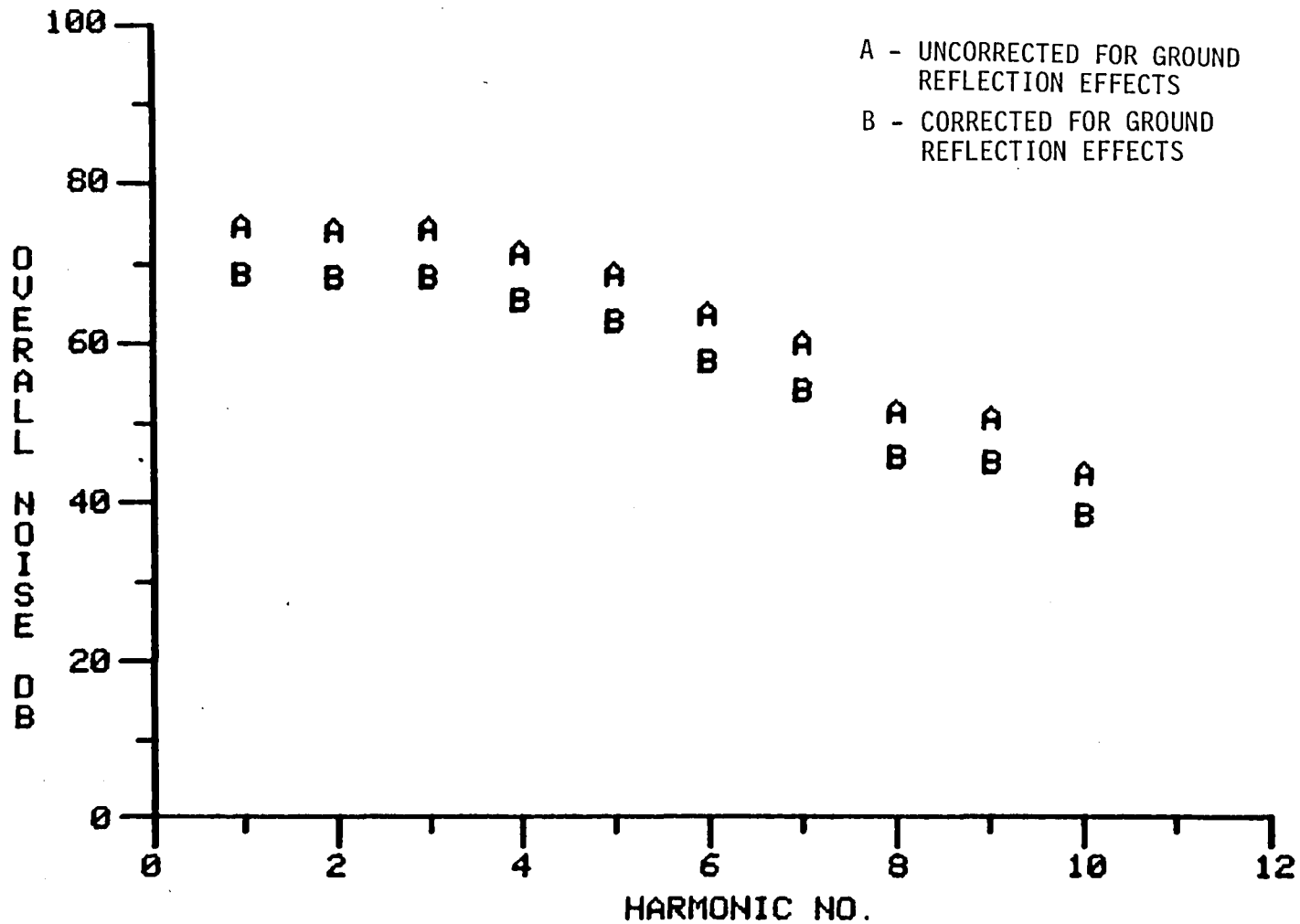


Figure D-8(b) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V - 72.02m/sec (140 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

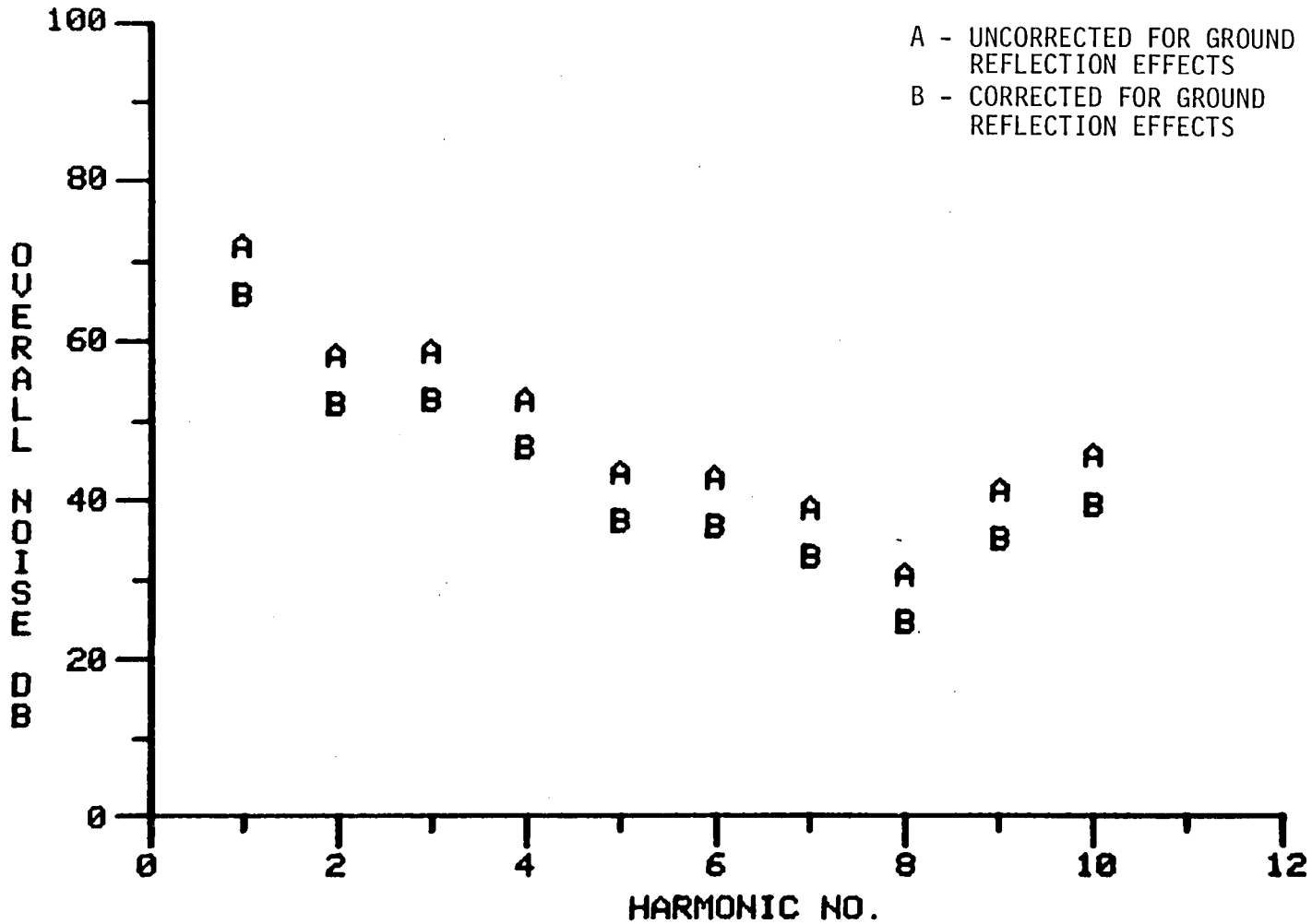


Figure D-8(c) - Comparison of experimental acoustic pressure spectra with and without ground reflection correction. V = 72.02m/sec (140 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter.

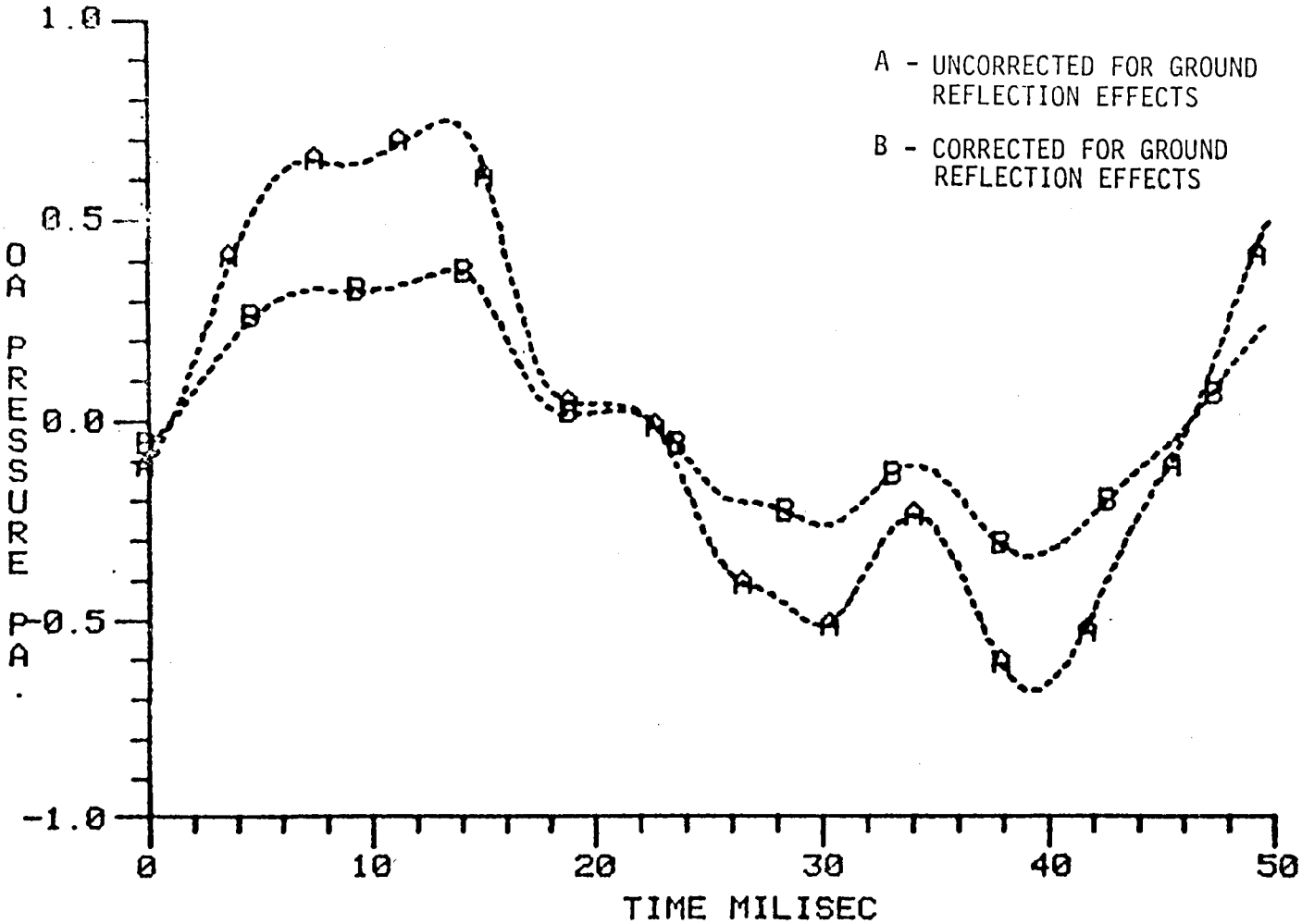


Figure D-9(a) - Comparison of experimental acoustic pressure signatures with and withou ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 304.8m (1000 ft.) ahead of helicopter.

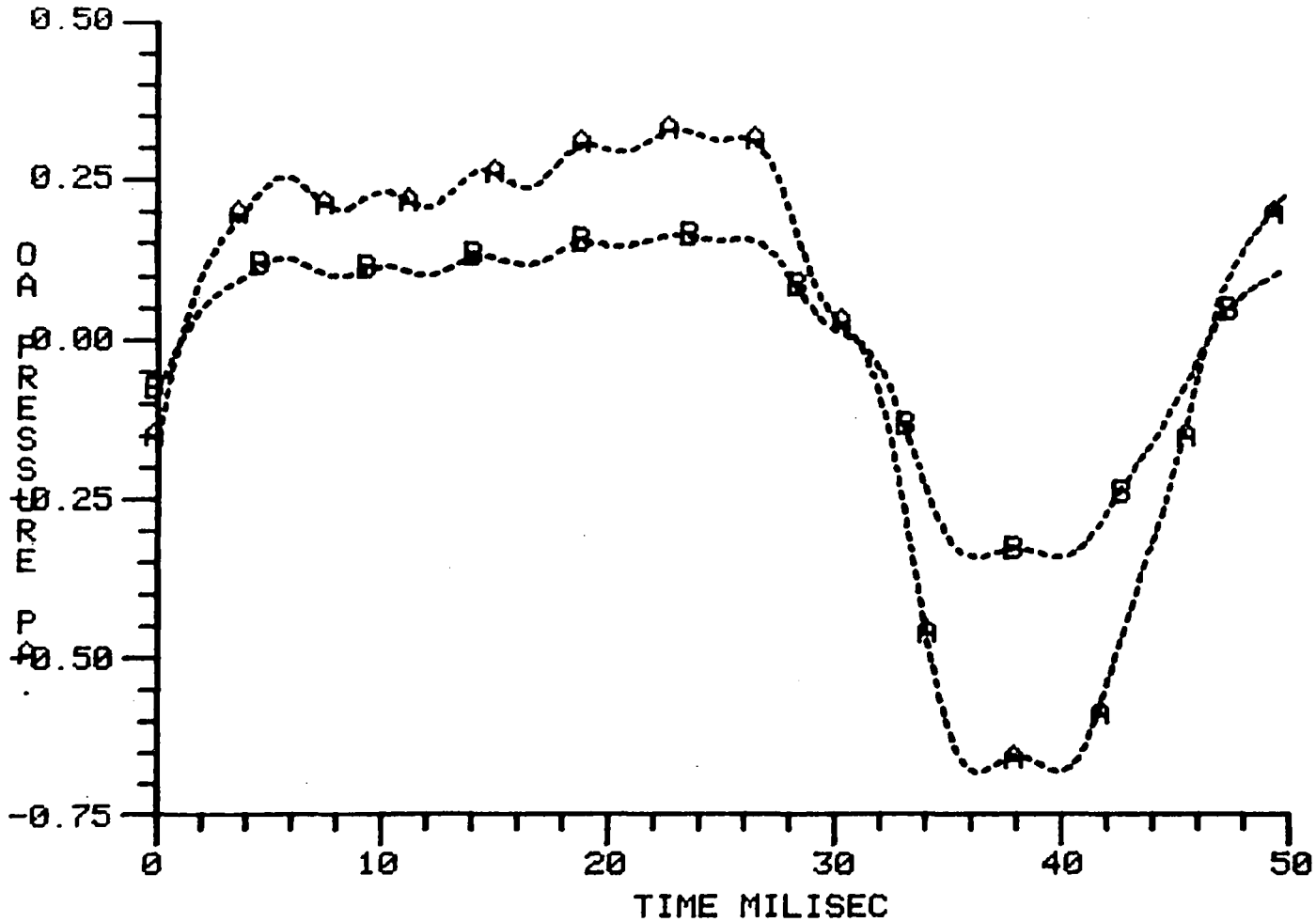


Figure D-9(b) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.

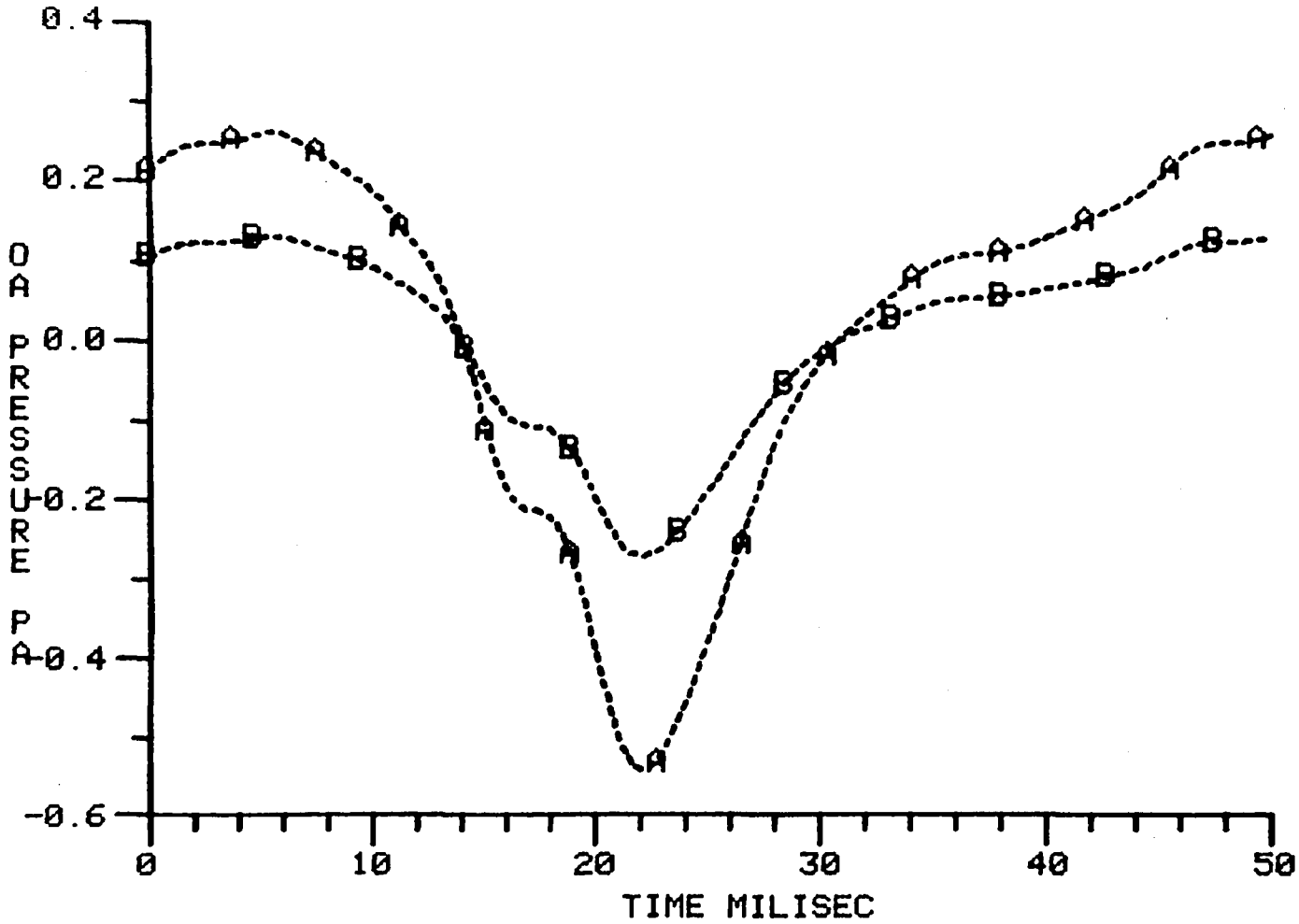


Figure D-9(c) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 48.9m/sec (95 kt). Helicopter altitude - 152.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.

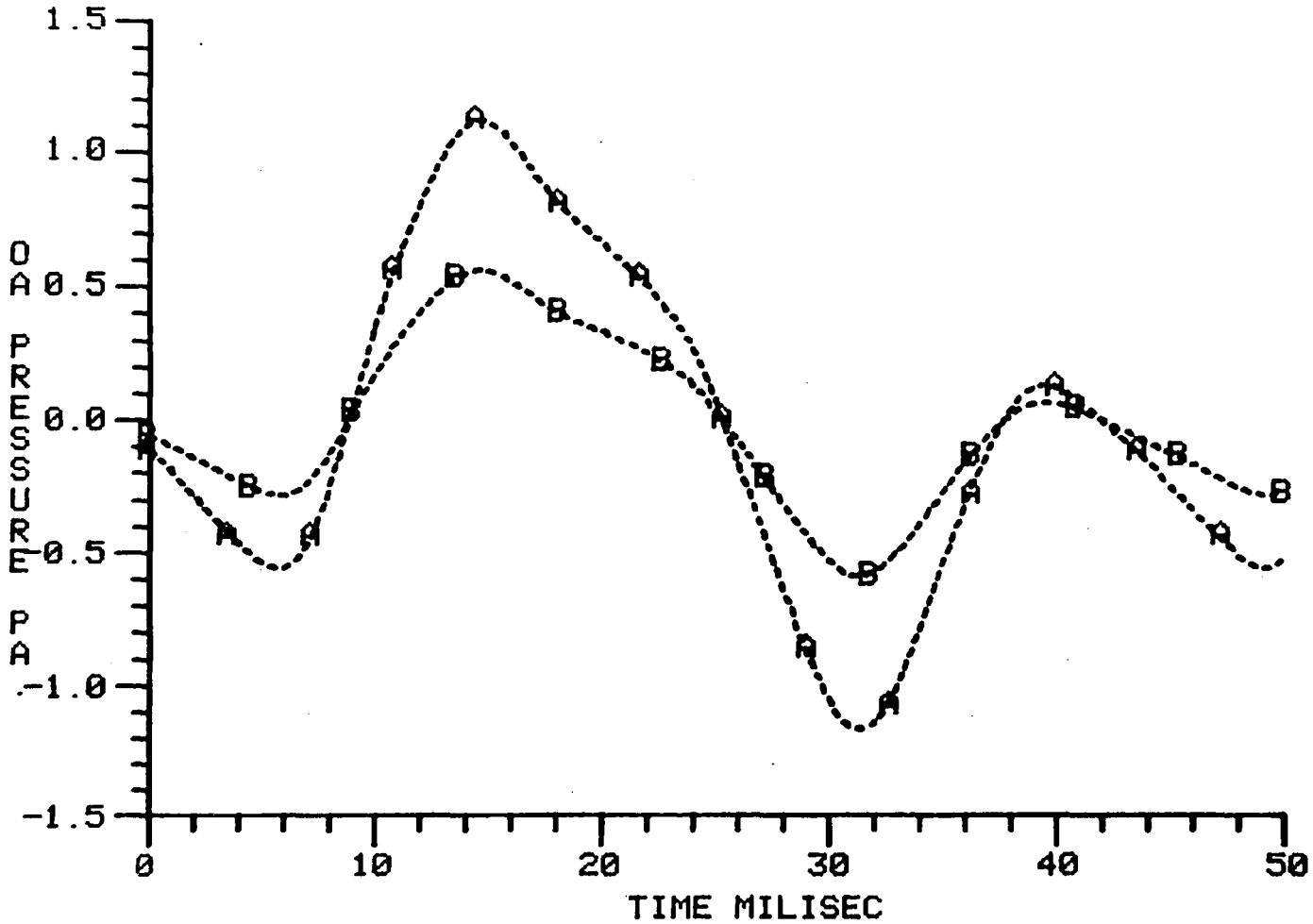


Figure D-10(a) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude - 152.4m (500 ft.). Observer fixed to ground 304.8m (1000 ft.) ahead of helicopter.

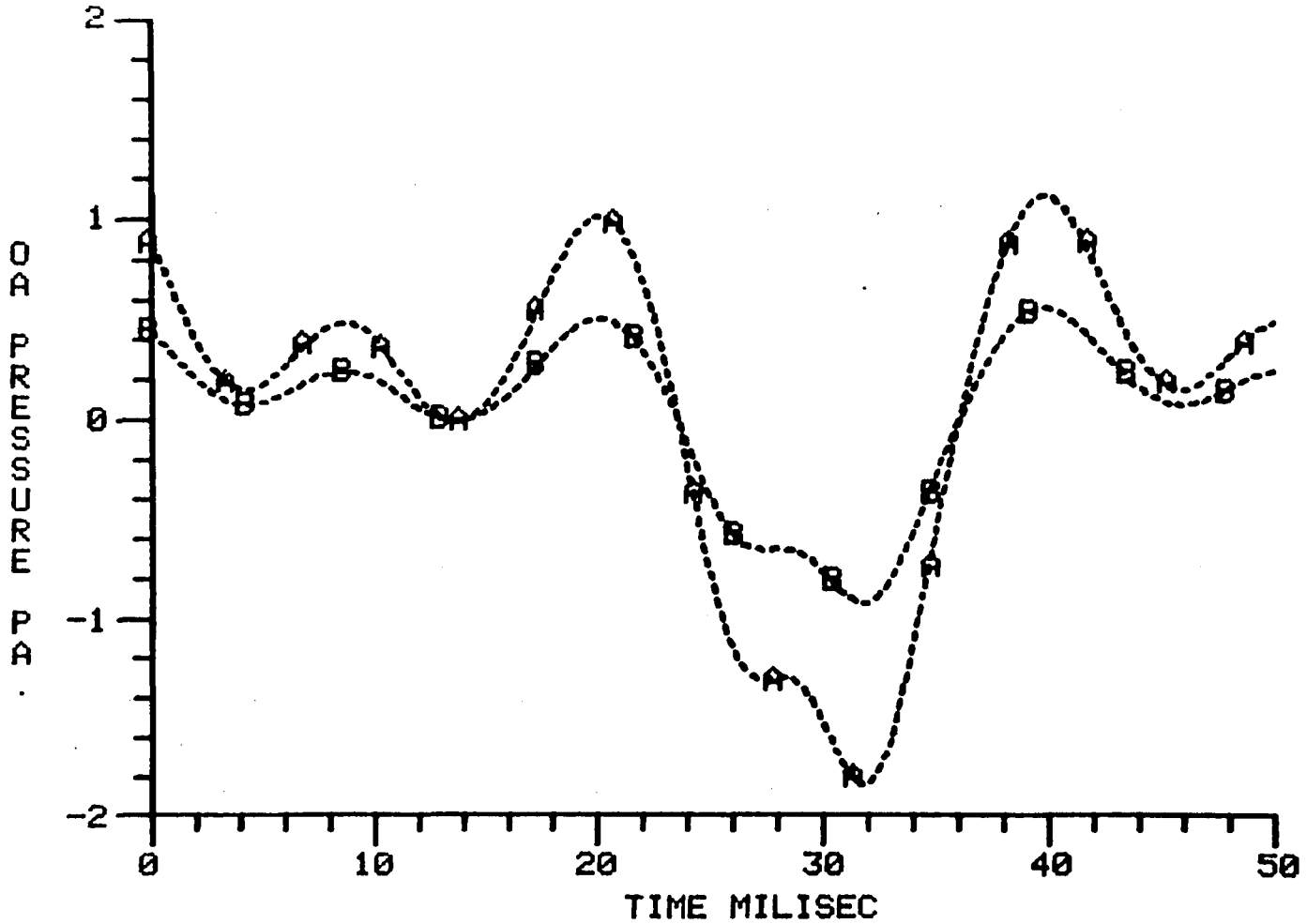


Figure D-10(b) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 609.6m (2000 ft.) ahead of helicopter.

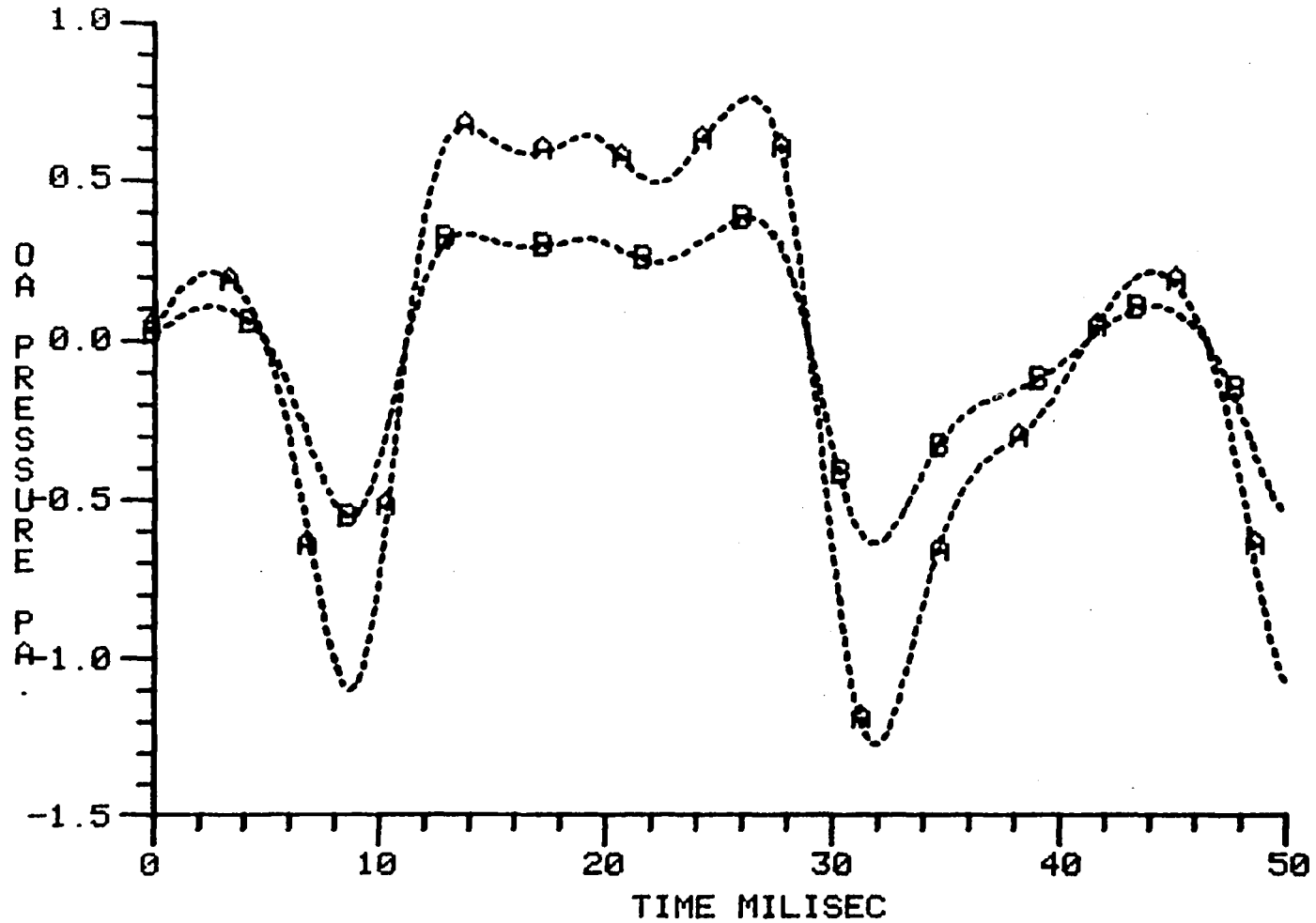


Figure D-10(c) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 82.3m/sec (160 kt). Helicopter altitude = 152.4m (500 ft.). Observer fixed to ground 1219.2m (4000 ft.) ahead of helicopter.

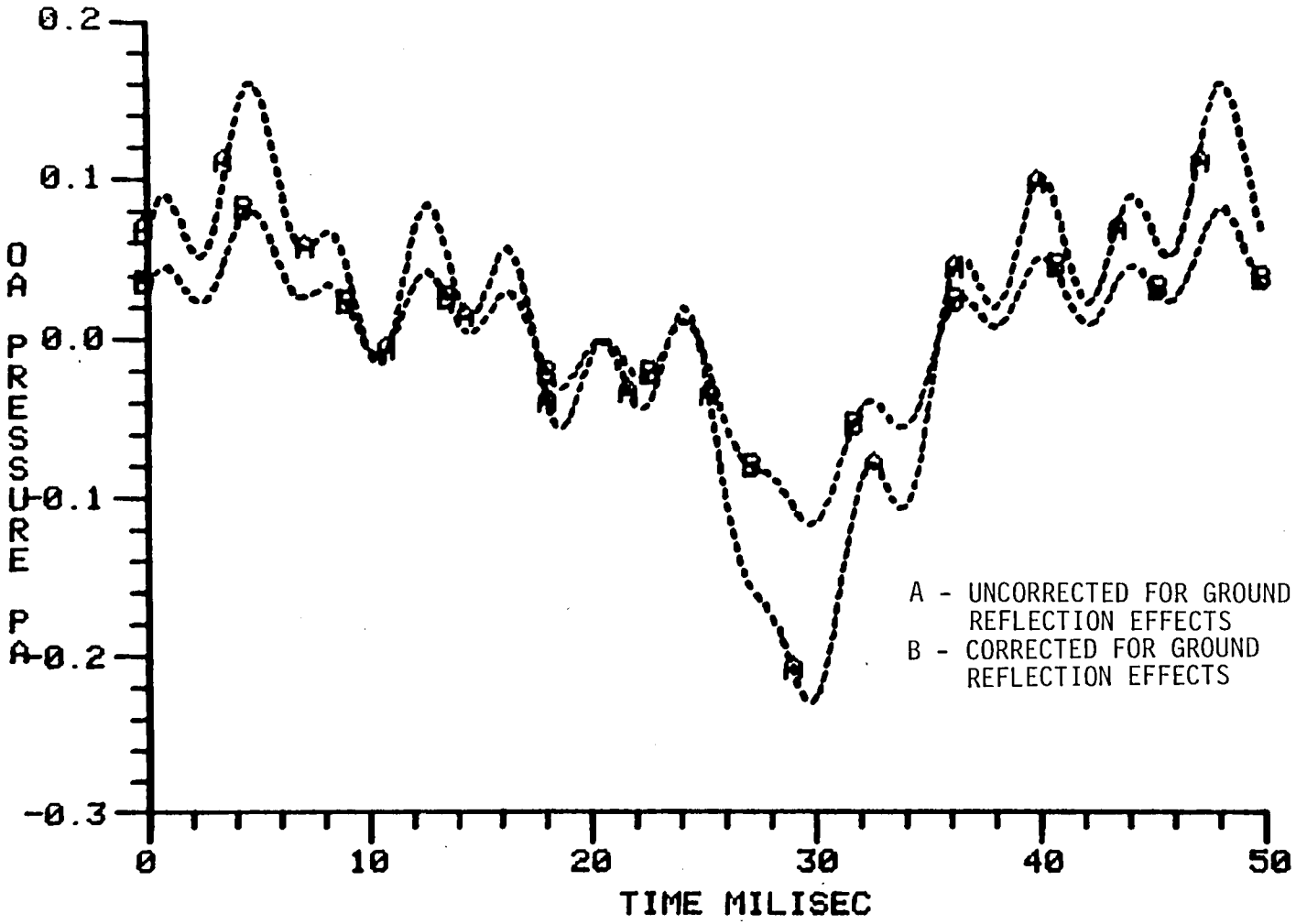


Figure D-11(a) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

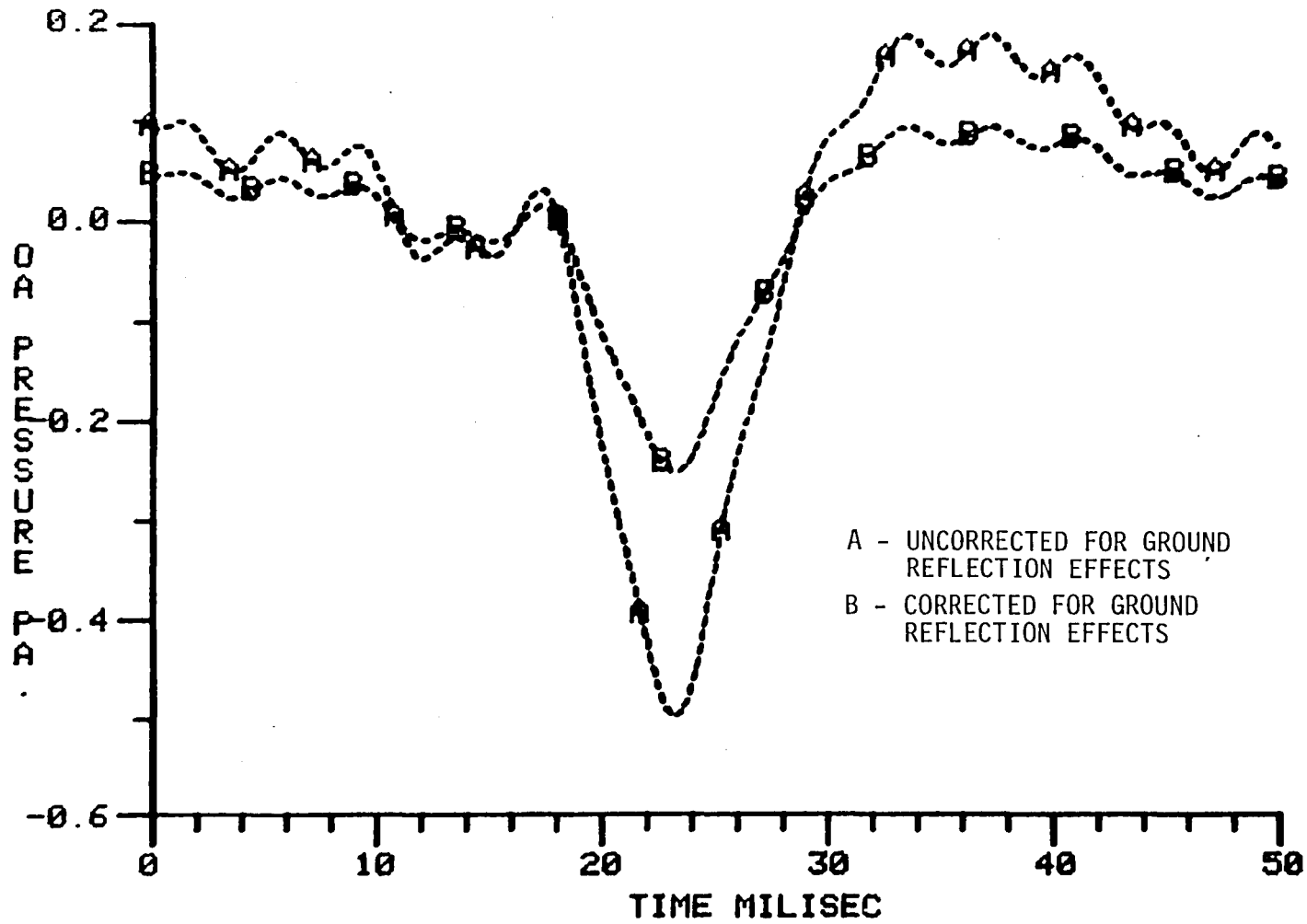


Figure D-11(b) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude - 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

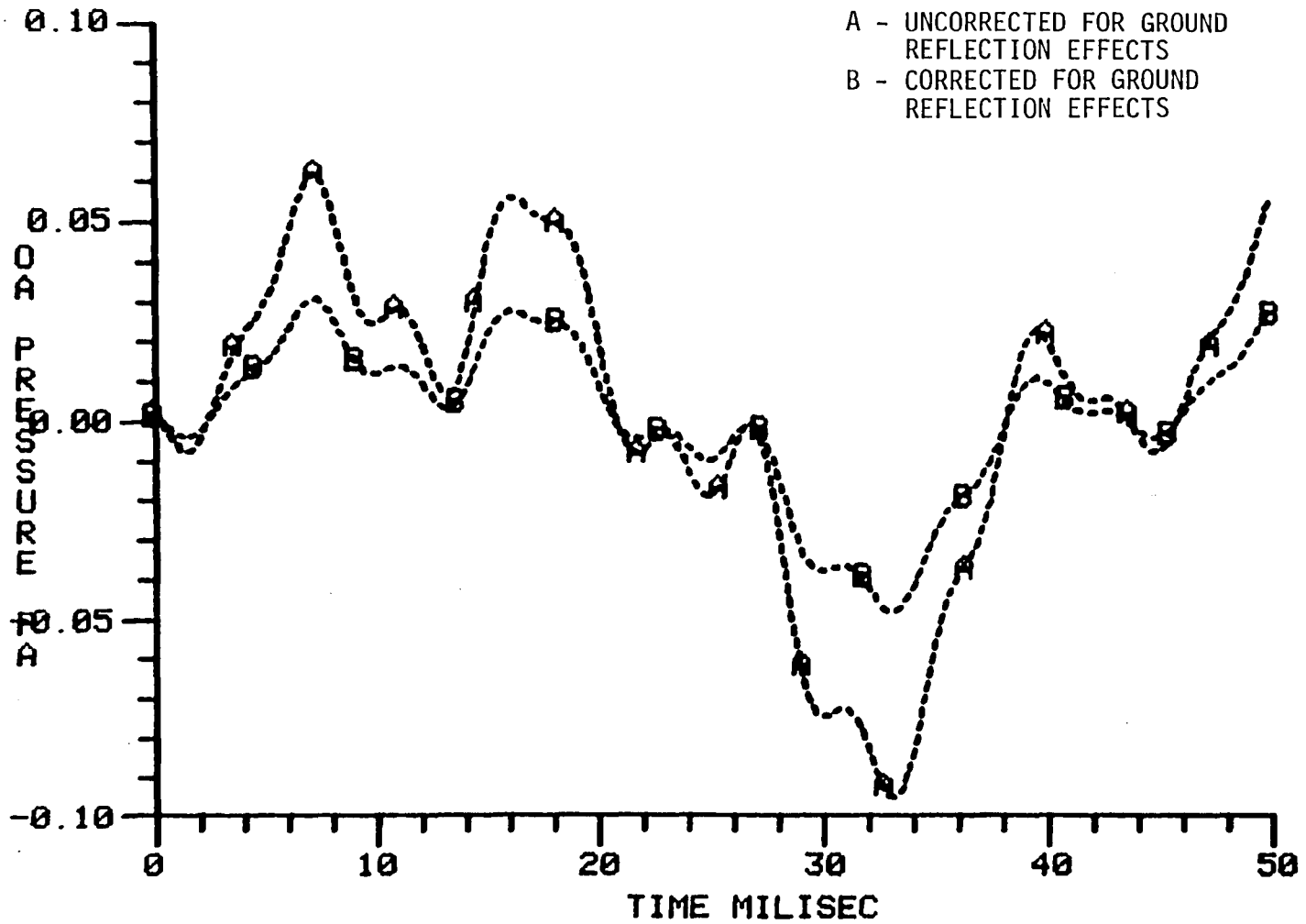


Figure D-11(c) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 51.4m/sec (100 kt). Helicopter altitude = 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft) ahead of helicopter.

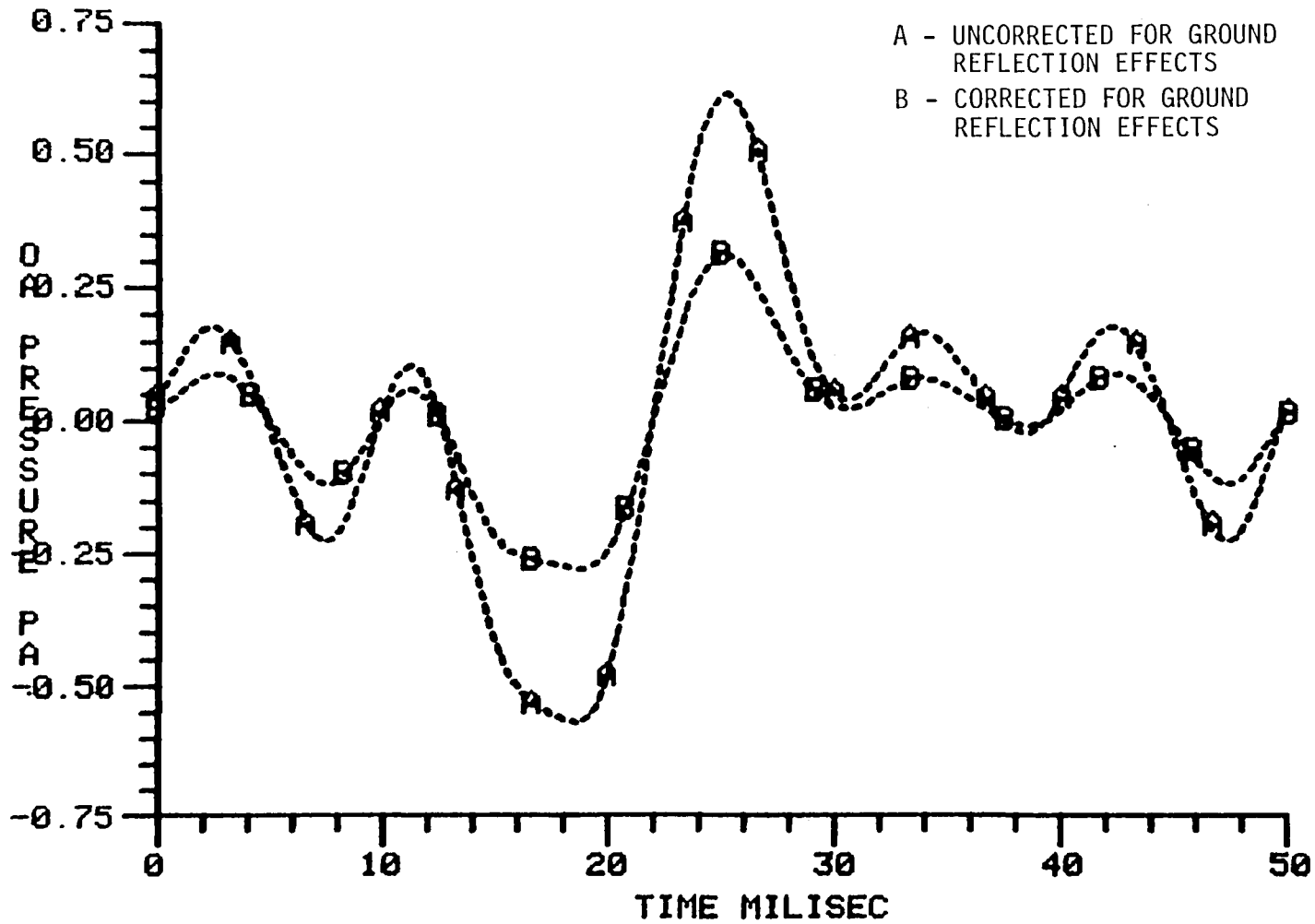


Figure D-12(a) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 72.02m/sec (140 kt). Helicopter altitude 152.4m (500 ft). Observer fixed to ground 304.8m (1000 ft) ahead of helicopter.

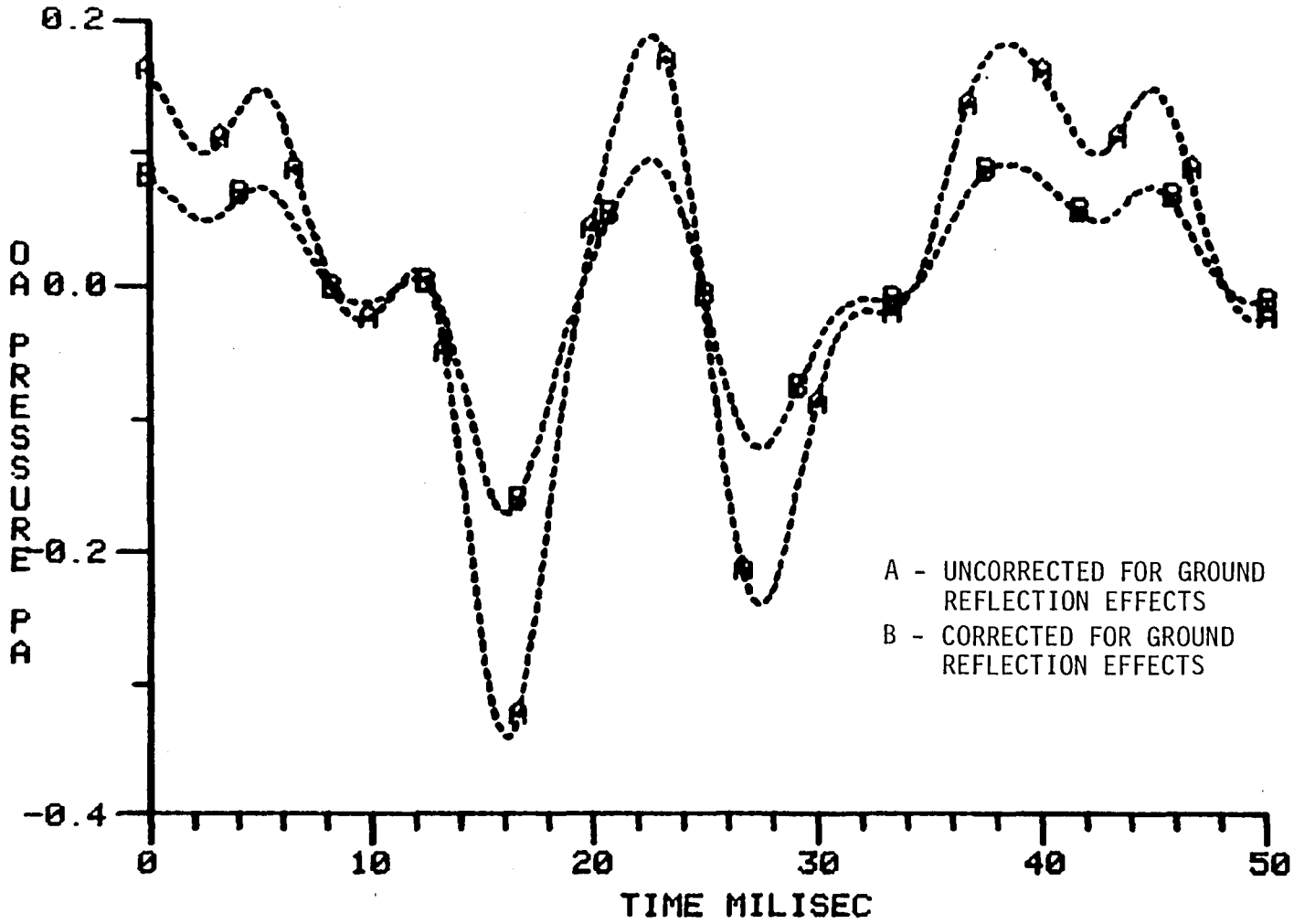


Figure D-12(b) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 72.02m/sec (140 kt). Helicopter altitude 152.4m (500 ft). Observer fixed to ground 609.6m (2000 ft) ahead of helicopter.

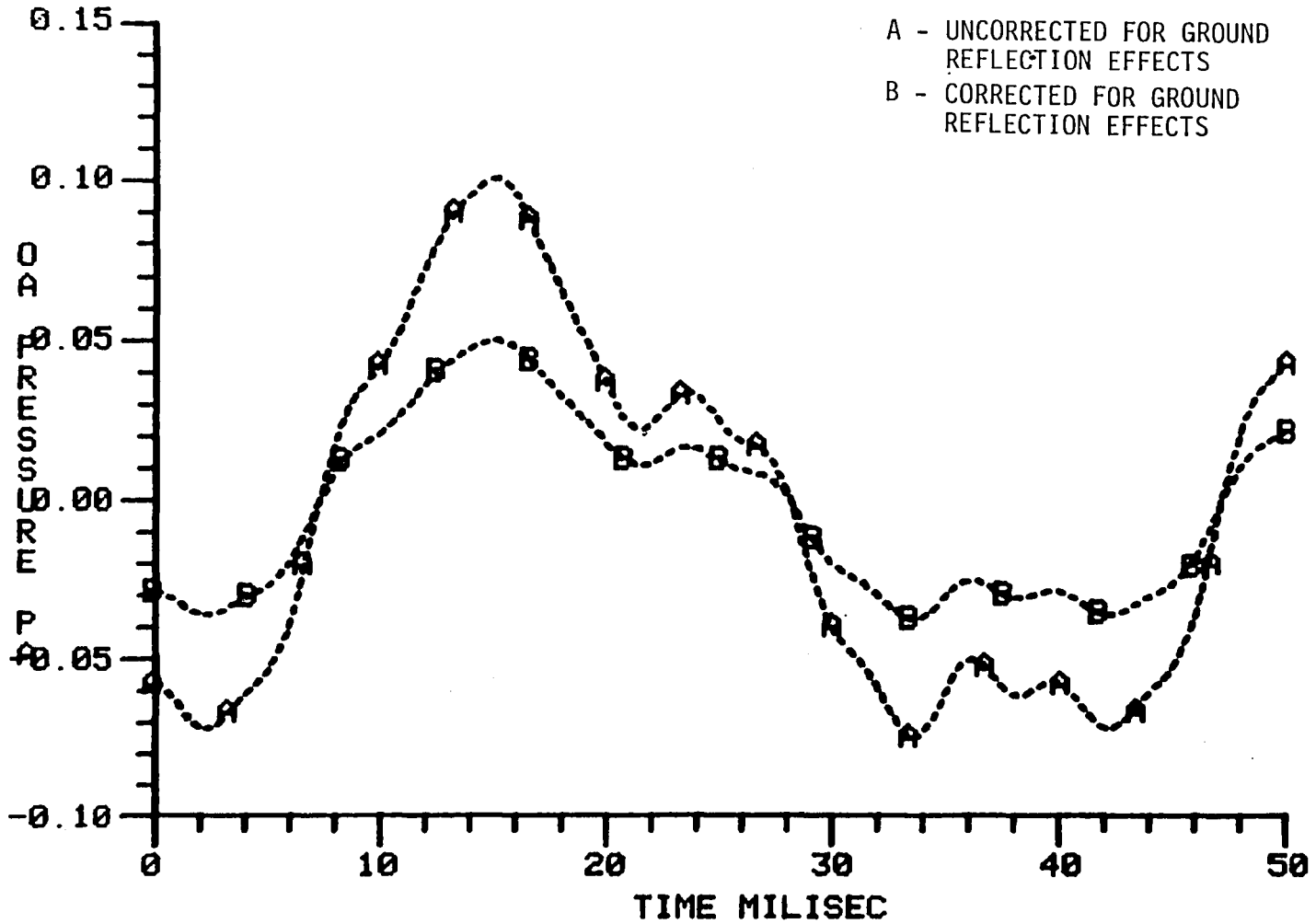
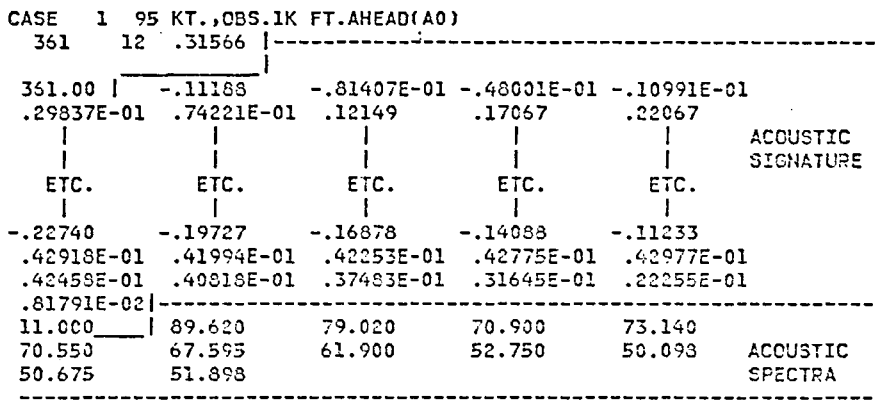


Figure D-12(c) - Comparison of experimental acoustic pressure signatures with and without ground reflection correction. V = 72.02m/sec (140 kt). Helicopter altitude 152.4m (500 ft). Observer fixed to ground 1219.2m (4000 ft).

APPENDIX E
MEASURED ACOUSTIC DATA LISTING

Appendix E contains a listing of the measured acoustic data used in this study. The listing is divided into acoustic signature and harmonic spectra data as illustrated in the figure below:



The data itself consists of 24 cases (3 observer positions and 4 flight speeds). Flight speeds of 95 and 160 knots refer to the CH-53A data and those of 100 and 140 knots the S-76 data. Note the (A) or (B) included in each case title. These designate, respectively, data uncorrected and corrected for ground reflection effects.

```
CASE   1  95 KT.,OBS.1K FT.AHEAD(A0)
  361    12  .31566
 361.00       -.11188      -.81407E-01 -.48001E-01 -.10991E-01
 .29837E-01   .74221E-01    .12149      .17067      .22067
 .27039       .31887       .36536      .40932      .45040
 .48834       .52290       .55382      .58079      .60348
 .62161       .63505       .64391      .64858      .64978
 .64847       .64578       .64284      .64066      .63999
 .64127       .64458       .64977      .65649      .66435
 .67306       .68242       .69240      .70298      .71407
 .72533       .73601       .74490      .75031      .75023
 .74254       .72531       .69718      .65758      .60701
 .54703       .48019       .40976      .33937      .27257
 .21242       .16113       .11993      .88943E-01  .67383E-01
 .53765E-01   .46231E-01   .42872E-01  .41991E-01  .42267E-01
 .42787E-01   .42977E-01   .42437E-01  .40760E-01  .37373E-01
 .31454E-01   .21958E-01   .77426E-02 -.12210E-01 -.38549E-01
-.71326E-01  -.10985      -.15268     -.19773     -.24250
-.28451      -.32154      -.35211     -.37557     -.39230
-.40352      -.41110      -.41719     -.42380     -.43246
-.44389      -.45794      -.47356     -.48901     -.50217
-.51092      -.51345      -.50859     -.49596     -.47599
-.44988      -.41936      -.38646     -.35329     -.32179
-.29365      -.27016      -.25231     -.24080     -.23610
-.23852      -.24826      -.26532     -.28949     -.32025
-.35672      -.39763      -.44132     -.48588     -.52926
-.56949      -.60479      -.63381     -.65567     -.66999
-.67681      -.67656      -.66982     -.65728     -.63955
-.61717      -.59057      -.56014     -.52633     -.48970
-.45097      -.41107      -.37101     -.33183     -.29442
-.25940      -.22696      -.19686     -.16838     -.14047
-.11190      -.81430E-01 -.48027E-01 -.11020E-01  .29806E-01
 .74187E-01   .12145       .17063      .22063      .27035
 .31883       .36532       .40929      .45037      .48831
 .52287       .55380       .58077      .60346      .62160
 .63504       .64390       .64858      .64978      .64848
 .64578       .64284       .64066      .63999      .64127
 .64458       .64977       .65648      .66435      .67305
 .68241       .69239       .70297      .71406      .72532
 .73600       .74489       .75031      .75023      .74255
 .72533       .69720       .65762      .60706      .54708
 .48024       .40981       .33942      .27262      .21246
 .16118       .11997       .88976E-01  .67409E-01  .53782E-01
 .46241E-01   .42875E-01   .41991E-01  .42264E-01  .42785E-01
 .42976E-01   .42438E-01   .40765E-01  .37385E-01  .31474E-01
 .21993E-01   .77969E-02 -.12133E-01 -.38441E-01 -.71191E-01
-.10969      -.15250      -.19753     -.24231     -.28432
-.32138      -.35198      -.37548     -.39223     -.40347
-.41106      -.41716      -.42376     -.43240     -.44382
-.45785      -.47346      -.48892     -.50210     -.51088
-.51346      -.50866      -.49608     -.47617     -.45010
-.41961      -.38672      -.35355     -.32204     -.29386
-.27034      -.25244      -.24087     -.23611     -.23847
-.24813      -.26512      -.28922     -.31991     -.35633
-.39719      -.44086      -.48542     -.52882     -.56907
-.60443      -.63353      -.65547     -.66986     -.67677
-.67660      -.66994      -.65746     -.63979     -.61747
-.59092      -.56054      -.52678     -.49019     -.45149
-.41160      -.37154      -.33235     -.29492     -.25986
-.22740      -.19727      -.16878     -.14088     -.11233
-.81899E-01 -.48550E-01 -.11606E-01  .29157E-01  .73482E-01
 .12070       .16985       .21984      .26956      .31806
 .36458       .40859       .44972      .48770      .52232
 .55330       .58034       .60311      .62132      .63485
 .64378       .64853       .64978      .64851      .64584
 .64289       .64069       .63999      .64122      .64450
 .64965       .65634       .66418      .67287      .68222
 .69218       .70275       .71383      .72509      .73579
 .74474       .75024       .75031      .74280      .72581
 .69794       .65860       .60827      .54849      .48178
 .41140       .34098       .27407      .21374      .16224
 .12080       .89576E-01   .67806E-01  .54018E-01  .46359E-01
 .42918E-01   .41994E-01   .42253E-01  .42775E-01  .42977E-01
 .42458E-01   .40818E-01   .37483E-01  .31645E-01  .22255E-01
 .81791E-02
 11.000       89.620       79.020      70.900      73.140
 70.550       67.595       61.900      52.750      50.098
 50.675       51.898
CASE   2  160KT.,OBS.1000FT.AHEAD(A0)
  361    10  .30193
 361.00       -.11011      -.13483     -.16047     -.18694
-.21407      -.24163      -.26940     -.29716     -.32479
-.35220      -.37940      -.40636     -.43302     -.45915
-.48433      -.50786      -.52872     -.54565     -.55713
-.56153      -.55723      -.54280     -.51712     -.47954
-.42997      -.36894      -.29756     -.21748     -.13072
-.39517E-01   .53839E-01   .14723      .23884      .32727
 .41163       .49147       .56674      .63769      .70469
 .76810       .82811       .88468      .93740      .98559
 1.0283       1.0644       1.0929      1.1127      1.1234
 1.1245       1.1165       1.1000      1.0763      1.0468
 1.0134       .97770       .94144      .90600      .87241
 .84128       .81283       .78688      .76299      .74056
 .71890       .69741       .67558      .65308      .62977
 .60563       .58073       .55513      .52883      .50170
 .47341       .44351       .41135      .37623      .33747
 .29445       .24673       .19412      .13669      .74788E-01
 .89716E-02  -.60020E-01  -.13137     -.20427     -.27800
-.35197      -.42575      -.49905     -.57171     -.64353
-.71430      -.78361      -.85084     -.91509     -.97519
-1.0297      -1.0772      -1.1161     -1.1448     -1.1623
-1.1678      -1.1608      -1.1415     -1.1106     -1.0692
-1.0188      -.96096      -.89746     -.82998     -.76003
-.68885      -.61741      -.54642     -.47635     -.40755
-.34031      -.27494      -.21191     -.15181     -.95370E-01
-.43482E-01   .29454E-02   .43022E-01  .76002E-01  .10137
 .11891       .12874       .13131      .12738      .11793
 .10408       .86927E-01   .67533E-01  .46768E-01  .25277E-01
 .34625E-02  -.18515E-01  -.40680E-01 -.63191E-01 -.86264E-01
-.11009      -.13481      -.16045     -.18691     -.21404
-.24161      -.26938      -.29714     -.32476     -.35218
-.37938      -.40634      -.43300     -.45913     -.48431
-.50784      -.52871      -.54564     -.55712     -.56153
-.55724      -.54282      -.51714     -.47957     -.43001
-.36899      -.29762      -.21754     -.13078     -.39583E-01
 .53770E-01   .14716       .23877      .32721      .41157
 .49141       .56668       .63763      .70463      .76805
 .82807       .88463       .93736      .98555      1.0283
 1.0644       1.0929       1.1127      1.1234      1.1245
 1.1165       1.1000       1.0763      1.0469      1.0134
```

Figure E-1 - Measured Acoustic Data Listings.

```
 .97772       .94147       .90602       .87243       .84130
 .81285       .78690       .76301       .74058       .71892
 .69743       .67560       .65310       .62980       .60566
 .58076       .55517       .52888       .50175       .47347
 .44357       .41142       .37632       .33757       .29456
 .24686       .19427       .13686       .74972E-01   .91766E-02
-.59797E-01  -.13114      -.20402      -.27774      -.35170
-.42548      -.49878      -.57143      -.64325      -.71401
-.78332      -.85056      -.91481      -.97493      -1.0295
-1.0770      -1.1159      -1.1447      -1.1623      -1.1678
-1.1608      -1.1416      -1.1108      -1.0695      -1.0191
-.96132      -.89786      -.83041      -.76047      -.68930
-.61788      -.54689      -.47682      -.40802      -.34077
-.27540      -.21236      -.15223      -.95773E-01  -.43853E-01
 .26155E-02   .42739E-01   .75773E-01   .10120       .11880
 .12868       .13131       .12744       .11804       .10421
 .87090E-01   .67713E-01   .46960E-01   .25481E-01   .36666E-02
-.18304E-01  -.40465E-01  -.62968E-01  -.86035E-01  -.10985
-.13455      -.16018      -.18663      -.21376      -.24132
-.26908      -.29684      -.32446      -.35188      -.37908
-.40604      -.43270      -.45884      -.48403      -.50758
-.52849      -.54547      -.55702      -.56152      -.55735
-.54305      -.51753      -.48010      -.43069      -.36981
-.29857      -.21860      -.13192      -.40777E-01   .52558E-01
 .14594       .23758       .32606       .41047       .49036
 .56569       .63669       .70373       .76719       .82725
 .88386       .93664       .98490      1.0277       1.0639
1.0925       1.1125       1.1233       1.1246       1.1167
1.1003       1.0767       1.0473       1.0139       .97829
 .94204       .90658       .87295       .84178       .81329
 .78730       .76339       .74094       .71928       .69779
 .67597       .65349       .63020       .60607       .58119
 .55560
 9.0000      90.330       88.870       81.390       74.650
 63.960      49.580       58.060       46.830       55.760
CASE    3   95KT.,OBS.2000FT.AHEAD(A0)
  361     12  .31566
 361.00      -.15093      -.10616      -.61318E-01  -.18048E-01
 .22052E-01   .57734E-01   .88308E-01   .11375       .13466
 .15210       .16733       .18154       .19553       .20957
 .22334       .23601       .24645       .25351       .25633
 .25461       .24871       .23968       .22907       .21870
 .21030       .20518       .20398       .20658       .21209
 .21908       .22586       .23088       .23302       .23187
 .22780       .22186       .21562       .21076       .20875
 .21053       .21627       .22532       .23637       .24766
 .25737       .26399       .26661       .26517       .26039
 .25371       .24692       .24187       .24005       .24229
 .24866       .25840       .27014       .28216       .29278
 .30065       .30505       .30600       .30421       .30090
 .29753       .29547       .29569       .29857       .30386
 .31072       .31795       .32429       .32866       .33045
 .32961       .32667       .32260       .31854       .31549
 .31408       .31432       .31554       .31646       .31542
 .31066       .30070       .28461       .26227       .23443
 .20262       .16893       .13569       .10504       .78584E-01
 .57107E-01   .40421E-01   .27365E-01   .15969E-01   .37347E-02
-.12001E-01  -.33681E-01  -.63184E-01  -.10156      -.14888
-.20422      -.26576      -.33101      -.39704      -.46081
-.51948      -.57065      -.61259      -.64435      -.66588

-.67791      -.68191      -.67989      -.67414      -.66700
-.66058      -.65649      -.65566      -.65823      -.66357
-.67035      -.67676      -.68079      -.68052      -.67445
-.66168      -.64207      -.61622      -.58533      -.55101
-.51495      -.47862      -.44307      -.40872      -.37537
-.34233      -.30856      -.27306      -.23504      -.19422
-.15096      -.10620      -.61351E-01  -.18079E-01   .22024E-01
 .57709E-01   .88287E-01   .11373       .13464       .15209
 .16732       .18153       .19552       .20956       .22333
 .23601       .24644       .25351       .25633       .25462
 .24872       .23969       .22908       .21871       .21030
 .20518       .20399       .20658       .21209       .21907
 .22585       .23087       .23302       .23188       .22780
 .22187       .21563       .21076       .20875       .21053
 .21627       .22532       .23637       .24766       .25737
 .26398       .26662       .26517       .26040       .25371
 .24693       .24187       .24005       .24229       .24865
 .25839       .27012       .28215       .29276       .30064
 .30504       .30600       .30421       .30090       .29753
 .29547       .29567       .29855       .30383       .31069
 .31792       .32427       .32864       .33044       .32961
 .32668       .32262       .31855       .31550       .31408
 .31431       .31553       .31645       .31543       .31070
 .30077       .28472       .26242       .23461       .20282
 .16915       .13590       .10523       .78750E-01   .57241E-01
 .40528E-01   .27455E-01   .16059E-01   .38428E-02  -.11853E-01
-.33478E-01  -.62909E-01  -.10120      -.14844      -.20371
-.26521      -.33043      -.39645      -.46025      -.51897
-.57021      -.61223      -.64409      -.66571      -.67783
-.68190      -.67993      -.67421      -.66708      -.66064
-.65652      -.65565      -.65819      -.66350      -.67027
-.67670      -.68076      -.68056      -.67457      -.66189
-.64236      -.61658      -.58575      -.55147      -.51542
-.47910      -.44354      -.40918      -.37583      -.34279
-.30905      -.27358      -.23561      -.19484      -.15161
-.10687      -.62016E-01  -.18715E-01   .21443E-01   .57197E-01
 .87850E-01   .11337       .13434       .15183       .16709
 .18130       .19529       .20933       .22311       .23581
 .24629       .25342       .25633       .25469       .24886
 .23987       .22928       .21889       .21044       .20525
 .20398       .20651       .21197       .21894       .22574
 .23081       .23302       .23194       .22791       .22200
 .21575       .21084       .20876       .21046       .21611
 .22511       .23613       .24743       .25719       .26388
 .26660       .26524       .26053       .25387       .24707
 .24196       .24004       .24219       .24847       .25814
 .26984       .28188       .29255       .30049       .30498
 .30601       .30427       .30098       .29760       .29549
 .29564       .29845       .30369       .31052       .31776
 .32414
 11.000      86.790       81.530       69.030       53.180
 59.610      58.230       60.070       59.710       54.890
 56.660      52.720
CASE    4   160KT.,OBS.2000FT.AHEAD(A0)
  361     10  .28935
 361.00       .88172       .81493       .74498       .67356
 .60220       .53234       .46531       .40235       .34458
 .29302       .24856       .21193       .18367       .16411
 .15332       .15110       .15699       .17028       .19004
 .21517       .24442       .27648       .31001       .34367
```

Figure-E-1 Continued.

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 .37619       .40634       .43299       .45511       .47179
 .48224       .48584       .48214       .47095       .45230
 .42654       .39430       .35654       .31450       .26964
 .22361       .17813       .13492      .95581E-01   .61514E-01
 .33869E-01   .13486E-01   .89453E-03 -.36711E-02 -.22418E-03
 .11033E-01   .29783E-01   .55652E-01   .88266E-01   .12727
 .17235       .22316       .27935       .34041       .40571
 .47435       .54521       .61690       .68778       .75605
 .81981       .87715       .92627       .96554       .99356
1.0092       1.0117       1.0004       .97492       .93506
 .88069       .81178       .72838       .63068       .51910
 .39435       .25760       .11056      -.44451E-01  -.20448
-.36600      -.52503      -.67734      -.81876      -.94546
-1.0543      -1.1432      -1.2112      -1.2588      -1.2880
-1.3019      -1.3048      -1.3018      -1.2979      -1.2984
-1.3074      -1.3282      -1.3624      -1.4100      -1.4695
-1.5375      -1.6096      -1.6803      -1.7438      -1.7944
-1.8268      -1.8370      -1.8220      -1.7804      -1.7124
-1.6194      -1.5042      -1.3704      -1.2220      -1.0634
-.89858      -.73120      -.56433      -.40032      -.24086
-.87065E-01   .60387E-01   .20107       .33466       .46073
 .57873       .68784       .78707       .87526       .95122
1.0138       1.0621       1.0955       1.1137       1.1170
1.1060       1.0816       1.0454       .99879       .94364
 .88176       .81497       .74504       .67361       .60224
 .53238       .46536       .40239       .34462       .29305
 .24858       .21195       .18369       .16412       .15332
 .15109       .15698       .17026       .19003       .21515
 .24440       .27646       .30999       .34365       .37617
 .40632       .43297       .45509       .47178       .48223
 .48584       .48215       .47096       .45232       .42656
 .39432       .35657       .31452       .26967       .22364
 .17816       .13494      .95597E-01   .61529E-01   .33875E-01
 .13487E-01   .88658E-03 -.36864E-02 -.24481E-03   .11004E-01
 .29749E-01   .55623E-01   .88231E-01   .12724       .17230
 .22312       .27929       .34035       .40564       .47429
 .54515       .61683       .68772       .75599       .81975
 .87711       .92623       .96551       .99354      1.0092
1.0117       1.0004       .97494       .93510       .88075
 .81186       .72848       .63081       .51925       .39454
 .25782       .11081      -.44177E-01  -.20418      -.36569
-.52470      -.67702      -.81844      -.94516      -1.0541
-1.1430      -1.2110      -1.2587      -1.2879      -1.3018
-1.3048      -1.3017      -1.2979      -1.2984      -1.3074
-1.3281      -1.3622      -1.4098      -1.4692      -1.5372
-1.6093      -1.6800      -1.7436      -1.7942      -1.8268
-1.8370      -1.8221      -1.7807      -1.7128      -1.6199
-1.5049      -1.3712      -1.2229      -1.0643      -.89952
-.73216      -.56530      -.40127      -.24181      -.87983E-01
 .59488E-01   .20021       .33382       .45994       .57797
 .68714       .78642       .87469       .95073      1.0134
1.0618       1.0953       1.1136       1.1170       1.1061
1.0819       1.0457       .99920       .94411       .88229
 .81554       .74563       .67421       .60286       .53298
 .46594       .40293       .34512       .29350       .24898
 .21226       .18393       .16428       .15340       .15109
 .15690       .17011       .18981       .21488       .24410
 .27613       .30965       .34331       .37585       .40602
 .43272       .45490       .47164       .48216       .48584
 .48223       .47113       .45257       .42689       .39473

 .35704       .31504       .27021       .22418       .17870
 .13545      .96056E-01   .61909E-01   .34184E-01   .13695E-01
 .10010E-02 -.36756E-02 -.33320E-03   .10811E-01   .29461E-01
 .55228E-01   .87751E-01   .12666       .17164       .22238
 .27848       .33947       .40470       .47330       .54413
 .61581       .68671       .75503       .81886       .87631
 .92557       .96500       .99321      1.0091       1.0118
1.0007
9.0000       91.470       92.380       84.970       82.080
73.500       71.995       67.120       62.610       55.045
CASE   5  95KT.,OBS.4000FT.AHEAD(AO)
 361    12  .31566
 361.00       .21202       .22010       .22768       .23429
 .23961       .24346       .24587       .24707       .24747
 .24754       .24777       .24852       .25000       .25217
 .25478       .25741       .25957       .26075       .26058
 .25888       .25565       .25114       .24574       .23987
 .23394       .22823       .22283       .21763       .21238
 .20672       .20032       .19293       .18446       .17500
 .16478       .15408       .14317       .13211       .12077
 .10871      .95273E-01   .79646E-01   .61060E-01   .38956E-01
 .13165E-01 -.15963E-01 -.47517E-01 -.80088E-01 -.11192
-.14118      -.16622      -.18587      -.19967      -.20802
-.21212      -.21390      -.21571      -.22000      -.22897
-.24419      -.26641      -.29537      -.32990      -.36801
-.40722      -.44485      -.47839      -.50581      -.52571
-.53751      -.54132      -.53791      -.52843      -.51425
-.49667      -.47681      -.45547      -.43313      -.40997
-.38599      -.36111      -.33527      -.30855      -.28117
-.25349      -.22599      -.19917      -.17350      -.14934
-.12694      -.10638      -.87647E-01 -.70619E-01 -.55144E-01
-.41068E-01 -.28263E-01 -.16629E-01 -.60829E-02  .34565E-02
 .12098E-01   .19992E-01   .27331E-01   .34336E-01   .41226E-01
 .48181E-01   .55308E-01   .62610E-01   .69987E-01   .77242E-01
 .84120E-01   .90353E-01   .95710E-01   .10004       .10331
 .10561       .10710       .10804       .10872       .10941
 .11030       .11154       .11319       .11525       .11767
 .12039       .12335       .12652       .12988       .13342
 .13713       .14100       .14497       .14898       .15295
 .15684       .16065       .16444       .16835       .17256
 .17730       .18274       .18902       .19611       .20388
 .21201       .22010       .22767       .23429       .23961
 .24346       .24587       .24707       .24747       .24754
 .24777       .24852       .25000       .25216       .25477
 .25741       .25956       .26075       .26058       .25888
 .25565       .25115       .24574       .23987       .23394
 .22823       .22283       .21763       .21238       .20673
 .20033       .19294       .18447       .17501       .16478
 .15409       .14317       .13212       .12078       .10872
 .95285E-01   .79660E-01   .61077E-01   .38974E-01   .13186E-01
-.15940E-01 -.47493E-01 -.80064E-01 -.11190      -.14116
-.16620      -.18586      -.19966      -.20801      -.21212
-.21390      -.21570      -.22000      -.22895      -.24417
-.26636      -.29531      -.32983      -.36793      -.40713
-.44476      -.47831      -.50574      -.52567      -.53748
-.54132      -.53793      -.52848      -.51431      -.49675
-.47690      -.45557      -.43323      -.41008      -.38611
-.36123      -.33540      -.30869      -.28132      -.25364
-.22614      -.19932      -.17364      -.14948      -.12707
-.10651      -.87764E-01 -.70727E-01 -.55245E-01 -.41162E-01
```

Figure E-1-Continued.

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-.28350E-01 -.16709E-01 -.61574E-02  .33878E-02  .12034E-01
 .19933E-01  .27274E-01  .34280E-01  .41169E-01  .48122E-01
 .55247E-01  .62547E-01  .69924E-01  .77179E-01  .84062E-01
 .90300E-01  .95665E-01  .10001      .10329      .10559
 .10709      .10804      .10872      .10940      .11029
 .11153      .11317      .11523      .11765      .12036
 .12332      .12649      .12984      .13338      .13709
 .14095      .14492      .14893      .15290      .15679
 .16060      .16439      .16829      .17250      .17723
 .18266      .18892      .19601      .20376      .21189
 .21998      .22756      .23420      .23954      .24341
 .24584      .24706      .24746      .24753      .24776
 .24850      .24996      .25212      .25473      .25737
 .25953      .26074      .26060      .25892      .25572
 .25124      .24584      .23998      .23405      .22833
 .22293      .21773      .21248      .20684      .20046
 .19309      .18464      .17520      .16499      .15431
 .14339      .13235      .12102      .10898      .95583E-01
 .80014E-01  .61501E-01  .39481E-01  .13774E-01 -.15281E-01
-.46789E-01 -.79352E-01 -.11122     -.14056     -.16570
-.18548     -.19941     -.20787     -.21205     -.21386
-.21564     -.21985     -.22868     -.24374     -.26578
-.29458     -.32899     -.36703     -.40624     -.44394
-.47761     -.50519     -.52530     -.53730     -.54132
-.53808
 11.000      83.520      76.430      67.110      60.295
 60.239      58.470      56.250      56.430      50.999
 49.940      45.020
CASE    6  160KT.,OBS.4000FT.AHEAD(A0)
  361     11  .28935
 361.00      .42856E-01  .75436E-01  .10603      .13407
 .15897      .18017      .19711      .20928      .21628
 .21778      .21359      .20355      .18753      .16536
 .13669      .10099      .57511E-01  .53043E-02 -.56625E-01
-.12914     -.21274     -.30722     -.41146     -.52318
-.63881     -.75359     -.86169     -.95663     -1.0318
-1.0810     -1.0990     -1.0825     -1.0299     -.94234
-.82299     -.67737     -.51265     -.33711     -.15937
 .12289E-01  .17068      .31018      .42709      .51977
 .58846      .63504      .66257      .67477      .67560
 .66877      .65747      .64421      .63079      .61838
 .60768      .59906      .59275      .58895      .58782
 .58947      .59388      .60081      .60966      .61952
 .62914      .63705      .64179      .64205      .63698
 .62627      .61035      .59035      .56798      .54538
 .52483      .50848      .49803      .49461      .49859
 .50963      .52679      .54871      .57382      .60063
 .62784      .65447      .67984      .70343      .72468
 .74279      .75646      .76375      .76206      .74817
 .71861      .66993      .59919      .50448      .38527
 .24278      .80062E-01 -.98008E-01 -.28507     -.47370
-.65601     -.82431     -.97170     -1.0927     -1.1836
-1.2426     -1.2701     -1.2680     -1.2401     -1.1909
-1.1256     -1.0496     -.96782     -.88468     -.80374
-.72767     -.65825     -.59652     -.54282     -.49700
-.45855     -.42670     -.40052     -.37896     -.36092
-.34526     -.33086     -.31663     -.30158     -.28488
-.26586     -.24411     -.21946     -.19196     -.16189
-.12969     -.95899E-01 -.61138E-01 -.26022E-01  .88338E-02
 .42837E-01  .75418E-01  .10601      .13405      .15896
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```
 .18017      .19710      .20928      .21628      .21779
 .21360      .20356      .18755      .16538      .13671
 .10103      .57546E-01  .53463E-02 -.56577E-01 -.12909
-.21268     -.30715     -.41139     -.52310     -.63874
-.75352     -.86162     -.95658     -1.0317     -1.0809
-1.0990     -1.0825     -1.0300     -.94241     -.82308
-.67748     -.51276     -.33722     -.15949      .12184E-01
 .17058      .31009      .42703      .51971      .58842
 .63501      .66255      .67477      .67560      .66877
 .65747      .64422      .63080      .61839      .60769
 .59907      .59276      .58896      .58782      .58947
 .59388      .60081      .60966      .61952      .62914
 .63706      .64179      .64206      .63698      .62628
 .61036      .59036      .56799      .54539      .52484
 .50848      .49803      .49460      .49857      .50960
 .52675      .54866      .57377      .60057      .62778
 .65442      .67979      .70337      .72464      .74275
 .75644      .76375      .76208      .74824      .71873
 .67011      .59946      .50483      .38571      .24330
 .80669E-01 -.97339E-01 -.28436     -.47298     -.65532
-.82366     -.97114     -1.0922     -1.1832     -1.2424
-1.2700     -1.2681     -1.2402     -1.1911     -1.1260
-1.0500     -.96825     -.88512     -.80416     -.72807
-.65862     -.59685     -.54311     -.49726     -.45877
-.42689     -.40067     -.37909     -.36103     -.34536
-.33096     -.31673     -.30169     -.28500     -.26601
-.24429     -.21965     -.19218     -.16213     -.12994
-.96164E-01 -.61411E-01 -.26297E-01  .85595E-02  .42569E-01
 .75164E-01  .10577      .13384      .15878      .18001
 .19698      .20920      .21625      .21781      .21367
 .20369      .18774      .16562      .13702      .10141
 .58016E-01  .59045E-02 -.55907E-01 -.12831     -.21177
-.30614     -.41027     -.52191     -.63752     -.75232
-.86052     -.95564     -1.0311     -1.0806     -1.0990
-1.0829     -1.0308     -.94359     -.82462     -.67929
-.51478     -.33933     -.16159      .10183E-01  .16876
 .30851      .42573      .51871      .58770      .63455
 .66230      .67469      .67565      .66889      .65764
 .64439      .63098      .61855      .60782      .59917
 .59283      .58899      .58782      .58943      .59380
 .60069      .60952      .61938      .62900      .63696
 .64175      .64209      .63710      .62648      .61064
 .59069
 10.000      88.316      87.562      84.930      82.640
 79.870      76.036      69.150      64.130      59.596
 56.165
CASE    7   95 KT.,OBS.1K FT.AHEAD(B21)
  361     12  .31566
 361.00     -.58260E-01 -.41889E-01 -.23969E-01 -.42772E-02
 .17183E-01  .40186E-01  .64321E-01  .89063E-01  .11385
 .13816      .16158      .18381      .20469      .22417
 .24221      .25881      .27392      .28742      .29916
 .30897      .31672      .32237      .32601      .32787
 .32829      .32774      .32668      .32558      .32479
 .32456      .32501      .32616      .32796      .33038
 .33341      .33708      .34149      .34670      .35268
 .35923      .36593      .37203      .37656      .37833
 .37613      .36883      .35560      .33610      .31052
 .27965      .24484      .20785      .17063      .13513
 .10308      .75754E-01  .53910E-01  .37730E-01  .26877E-01
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Figure E-1-Continued.

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 .20617E-01  .17970E-01  .17881E-01  .19359E-01  .21570E-01
 .23870E-01  .25788E-01  .26960E-01  .27051E-01  .25690E-01
 .22435E-01  .16787E-01  .82569E-02 -.35394E-02 -.18763E-01
-.37255E-01 -.58483E-01 -.81546E-01 -.10525      -.12826
-.14925      -.16715      -.18125      -.19137      -.19782
-.20142      -.20327      -.20465      -.20670      -.21032
-.21593      -.22345      -.23232      -.24156      -.24998
-.25633      -.25952      -.25880      -.25382      -.24467
-.23187      -.21628      -.19894      -.18100      -.16355
-.14759      -.13394      -.12327      -.11608      -.11273
-.11347      -.11841      -.12756      -.14074      -.15760
-.17755      -.19980      -.22337      -.24715      -.27000
-.29083      -.30871      -.32295      -.33314      -.33918
-.34120      -.33954      -.33463      -.32694      -.31691
-.30490      -.29118      -.27598      -.25950      -.24197
-.22367      -.20496      -.18622      -.16786      -.15020
-.13346      -.11768      -.10268      -.88120E-01 -.73502E-01
-.58272E-01 -.41902E-01 -.23983E-01 -.42928E-02  .17167E-01
 .40168E-01  .64303E-01  .89043E-01  .11383      .13814
 .16156      .18379      .20468      .22415      .24220
 .25880      .27391      .28741      .29915      .30896
 .31671      .32237      .32601      .32786      .32829
 .32774      .32668      .32558      .32479      .32456
 .32501      .32616      .32796      .33038      .33340
 .33708      .34149      .34669      .35267      .35923
 .36592      .37203      .37656      .37833      .37613
 .36883      .35562      .33612      .31054      .27968
 .24487      .20787      .17065      .13516      .10310
 .75778E-01  .53932E-01  .37747E-01  .26890E-01  .20624E-01
 .17973E-01  .17880E-01  .19355E-01  .21564E-01  .23864E-01
 .25784E-01  .26958E-01  .27052E-01  .25696E-01  .22447E-01
 .16809E-01  .82895E-02 -.34940E-02 -.18701E-01 -.37179E-01
-.58395E-01 -.81450E-01 -.10515      -.12816      -.14916
-.16707      -.18120      -.19133      -.19780      -.20140
-.20327      -.20464      -.20669      -.21029      -.21589
-.22340      -.23226      -.24151      -.24993      -.25629
-.25952      -.25882      -.25387      -.24475      -.23198
-.21641      -.19908      -.18114      -.16369      -.14771
-.13405      -.12335      -.11613      -.11275      -.11344
-.11835      -.12745      -.14060      -.15741      -.17733
-.19956      -.22312      -.24690      -.26977      -.29061
-.30853      -.32281      -.33305      -.33914      -.34120
-.33958      -.33470      -.32705      -.31704      -.30505
-.29136      -.27618      -.25971      -.24220      -.22391
-.20521      -.18647      -.16810      -.15044      -.13369
-.11789      -.10289      -.88327E-01 -.73716E-01 -.58500E-01
-.42154E-01 -.24263E-01 -.46027E-02  .16828E-01  .39805E-01
 .63923E-01  .88654E-01  .11344      .13776      .16119
 .18344      .20434      .22384      .24191      .25853
 .27366      .28719      .29896      .30880      .31659
 .32229      .32596      .32784      .32829      .32775
 .32671      .32560      .32480      .32456      .32500
 .32613      .32792      .33033      .33334      .33700
 .34139      .34658      .35254      .35909      .36579
 .37191      .37649      .37833      .37623      .36905
 .35597      .33661      .31116      .28041      .24568
 .20871      .17148      .13593      .10378      .76342E-01
 .54367E-01  .38056E-01  .27083E-01  .20723E-01  .18000E-01
 .17861E-01  .19310E-01  .21510E-01  .23814E-01  .25747E-01
 .26940E-01  .27064E-01  .25745E-01  .22546E-01  .16967E-01

 .85180E-02
 11.000      83.620      73.020      64.900      67.140
 64.670      62.040      59.100      47.500      44.260
 44.690      45.900
CASE   8  160KT.,OBS.1000FT.AHEAD(B21)
  361    10  .30193
 361.00      -.57761E-01 -.69881E-01 -.82250E-01 -.94862E-01
-.10768      -.12067      -.13377      -.14695      -.16021
-.17357      -.18706      -.20069      -.21441      -.22809
-.24147      -.25413      -.26549      -.27483      -.28133
-.28410      -.28228      -.27513      -.26208      -.24282
-.21735      -.18598      -.14935      -.10835      -.64076E-01
-.17725E-01  .29507E-01  .76519E-01  .12239      .16643
 .20821      .24756      .28452      .31930      .35214
 .38329      .41292      .44103      .46745      .49182
 .51365      .53234      .54729      .55796      .56397
 .56515      .56155      .55353      .54166      .52671
 .50955      .49112      .47230      .45385      .43635
 .42017      .40547      .39220      .38017      .36908
 .35857      .34829      .33797      .32736      .31634
 .30484      .29283      .28031      .26725      .25357
 .23912      .22368      .20699      .18875      .16866
 .14648      .12205      .95312E-01  .66342E-01  .35324E-01
 .25422E-02 -.31653E-01 -.66889E-01 -.10281      -.13910
-.17554      -.21195      -.24827      -.28442      -.32035
-.35594      -.39099      -.42514      -.45792      -.48868
-.51666      -.54104      -.56098      -.57571      -.58463
-.58729      -.58355      -.57349      -.55750      -.53618
-.51030      -.48075      -.44847      -.41433      -.37912
-.34347      -.30787      -.27264      -.23800      -.20406
-.17091      -.13866      -.10748      -.77637E-01 -.49465E-01
-.23393E-01  .11525E-03  .20592E-01  .37625E-01  .50909E-01
 .60275E-01  .65726E-01  .67439E-01  .65743E-01  .61100E-01
 .54049E-01  .45158E-01  .34970E-01  .23964E-01  .12514E-01
 .88342E-03 -.10784E-01 -.22437E-01 -.34103E-01 -.45850E-01
-.57751E-01 -.69871E-01 -.82241E-01 -.94852E-01 -.10767
-.12066      -.13376      -.14694      -.16020      -.17356
-.18705      -.20068      -.21440      -.22808      -.24146
-.25412      -.26548      -.27482      -.28133      -.28410
-.28229      -.27514      -.26209      -.24284      -.21737
-.18600      -.14937      -.10838      -.64108E-01 -.17759E-01
 .29472E-01  .76485E-01  .12236      .16640      .20818
 .24753      .28450      .31927      .35211      .38327
 .41290      .44101      .46743      .49180      .51363
 .53232      .54727      .55796      .56397      .56514
 .56156      .55354      .54167      .52672      .50956
 .49113      .47232      .45386      .43636      .42018
 .40548      .39221      .38018      .36909      .35858
 .34830      .33798      .32737      .31636      .30485
 .29285      .28033      .26727      .25359      .23914
 .22371      .20703      .18879      .16871      .14654
 .12212      .95386E-01  .66427E-01  .35416E-01  .26441E-02
-.31543E-01 -.66773E-01 -.10268      -.13897      -.17541
-.21182      -.24813      -.28428      -.32020      -.35579
-.39084      -.42500      -.45778      -.48855      -.51654
-.54094      -.56090      -.57566      -.58460      -.58730
-.58359      -.57357      -.55761      -.53631      -.51046
-.48094      -.44867      -.41455      -.37934      -.34370
-.30810      -.27288      -.23823      -.20429      -.17113
-.13888      -.10770      -.77850E-01 -.49666E-01 -.23580E-01
```

Figure E-1-Continued.

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-.52423E-04  .20446E-01  .37506E-01  .50818E-01  .60214E-01
 .65697E-01  .67438E-01  .65770E-01  .61151E-01  .54119E-01
 .45243E-01  .35065E-01  .24066E-01  .12623E-01  .99173E-03
-.10672E-01 -.22325E-01 -.33989E-01 -.45734E-01 -.57630E-01
-.69745E-01 -.82110E-01 -.94719E-01 -.10754     -.12052
-.13362     -.14680     -.16005     -.17342     -.18690
-.20053     -.21425     -.22793     -.24131     -.25398
-.26536     -.27473     -.28127     -.28409     -.28234
-.27526     -.26229     -.24311     -.21772     -.18643
-.14986     -.10892     -.64689E-01 -.18364E-01  .28860E-01
 .75875E-01  .12176      .16582      .20763      .24701
 .28401      .31881      .35167      .38285      .41249
 .44063      .46707      .49147      .51333      .53207
 .54709      .55783      .56392      .56516      .56164
 .55369      .54188      .52696      .50984      .49143
 .47261      .45415      .43663      .42043      .40570
 .39242      .38037      .36926      .35875      .34848
 .33815      .32755      .31654      .30505      .29306
 .28054
 9.0000      84.330      82.870      75.390      68.670
 58.160      44.580      54.260      41.110      49.800
CASE   9  95KT.,OBS.2000FT.AHEAD(B1)
  361    12  .31566
 361.00      -.75977E-01 -.53376E-01 -.30699E-01 -.88173E-02
 .11429E-01  .29382E-01  .44680E-01  .57316E-01  .67614E-01
 .76146E-01  .83589E-01  .90575E-01  .97541E-01  .10463
 .11168      .11623      .12368      .12740      .12892
 .12808      .12503      .12033      .11479      .10937
 .10498      .10233      .10175      .10318      .10614
 .10988      .11351      .11619      .11733      .11670
 .11451      .11131      .10793      .10527      .10412
 .10497      .10791      .11263      .11840      .12431
 .12938      .13283      .13416      .13334      .13076
 .12717      .12353      .12081      .11980      .12094
 .12425      .12933      .13545      .14169      .14717
 .15118      .15334      .15367      .15257      .15068
 .14879      .14763      .14771      .14923      .15205
 .15570      .15955      .16291      .16520      .16609
 .16557      .16393      .16167      .15942      .15772
 .15693      .15706      .15778      .15842      .15811
 .15593      .15109      .14310      .13189      .11783
 .10173      .84666E-01  .67832E-01  .52336E-01  .39008E-01
 .28248E-01  .19956E-01  .13531E-01  .79599E-02  .19620E-02
-.58207E-02 -.16628E-01 -.31405E-01 -.50672E-01 -.74453E-01
-.10227     -.13319     -.16595     -.19909     -.23107
-.26048     -.28612     -.30712     -.32304     -.33382
-.33983     -.34182     -.34076     -.33783     -.33420
-.33092     -.32882     -.32839     -.32969     -.33243
-.33592     -.33925     -.34139     -.34135     -.33836
-.33195     -.32205     -.30897     -.29333     -.27596
-.25776     -.23948     -.22166     -.20453     -.18797
-.17159     -.15485     -.13721     -.11823     -.97771E-01
-.75993E-01 -.53393E-01 -.30716E-01 -.88329E-02  .11415E-01
 .29369E-01  .44670E-01  .57308E-01  .67608E-01  .76140E-01
 .83584E-01  .90570E-01  .97536E-01  .10463      .11167
 .11823      .12367      .12740      .12892      .12808
 .12503      .12033      .11479      .10937      .10499
 .10233      .10175      .10318      .10614      .10988
 .11351      .11618      .11733      .11670      .11451
 .11131      .10793      .10527      .10412      .10497
 .10791      .11262      .11840      .12430      .12938
 .13282      .13416      .13334      .13076      .12717
 .12353      .12081      .11980      .12094      .12425
 .12932      .13544      .14168      .14716      .15117
 .15333      .15367      .15257      .15068      .14879
 .14763      .14771      .14923      .15204      .15569
 .15954      .16289      .16519      .16609      .16558
 .16393      .16167      .15942      .15773      .15693
 .15706      .15778      .15842      .15811      .15595
 .15112      .14315      .13196      .11793      .10184
 .84775E-01  .67938E-01  .52433E-01  .39091E-01  .28315E-01
 .20009E-01  .13576E-01  .80037E-02  .20153E-02 -.57472E-02
-.16526E-01 -.31267E-01 -.50494E-01 -.74235E-01 -.10202
-.13291     -.16566     -.19879     -.23079     -.26022
-.28589     -.30695     -.32291     -.33373     -.33979
-.34181     -.34079     -.33787     -.33424     -.33095
-.32884     -.32838     -.32967     -.33239     -.33588
-.33922     -.34137     -.34137     -.33842     -.33206
-.32220     -.30915     -.29354     -.27620     -.25800
-.23972     -.22190     -.20476     -.18819     -.17182
-.15510     -.13747     -.11852     -.98078E-01 -.76320E-01
-.53731E-01 -.31052E-01 -.91542E-02  .11122E-01  .29112E-01
 .44452E-01  .57128E-01  .67459E-01  .76013E-01  .83469E-01
 .90457E-01  .97420E-01  .10451      .11156      .11812
 .12359      .12735      .12892      .12811      .12511
 .12043      .11490      .10947      .10506      .10237
 .10175      .10314      .10608      .10981      .11345
 .11615      .11732      .11674      .11457      .11138
 .10800      .10531      .10412      .10493      .10783
 .11251      .11827      .12419      .12929      .13277
 .13416      .13338      .13083      .12726      .12361
 .12086      .11980      .12089      .12415      .12919
 .13529      .14155      .14705      .15110      .15331
 .15368      .15260      .15073      .14883      .14764
 .14769      .14917      .15196      .15560      .15945
 .16283
 11.000      80.790      75.530      63.030      47.180
 53.610      52.230      54.070      53.760      49.040
 51.000      47.340
CASE  10  160KT.,OBS.2000FT.AHEAD(B1)
  361    10  .28935
 361.00       .44175      .40828      .37325      .33748
 .30176       .26678      .23322      .20168      .17273
 .14688       .12459      .10621      .92042E-01  .82235E-01
 .76832E-01   .75734E-01  .78710E-01  .85399E-01  .95328E-01
 .10794       .12260      .13866      .15544      .17227
 .18852       .20358      .21690      .22796      .23630
 .24155       .24338      .24157      .23601      .22672
 .21386       .19775      .17884      .15777      .13527
 .11216       .89320E-01  .67613E-01  .47850E-01  .30744E-01
 .16873E-01   .66614E-02  .37190E-03 -.18819E-02 -.11365E-03
 .55677E-02   .14995E-01  .27975E-01  .44316E-01  .63842E-01
 .86395E-01   .11182      .13992      .17049      .20319
 .23760       .27314      .30912      .34471      .37901
 .41104       .43984      .46449      .48417      .49817
 .50595       .50709      .50131      .48843      .46835
 .44104       .40648      .36471      .31583      .26002
 .19764       .12925      .55696E-01 -.21888E-01 -.10204
-.18298      -.26274     -.33919     -.41022     -.47390
-.52863      -.57332     -.60751     -.63142     -.64601
```

Figure E-1- Continued.

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-.65290       -.65422       -.65251       -.65041       -.65046
-.65484       -.66515       -.68226       -.70619       -.73610
-.77035       -.80667       -.84230       -.87431       -.89978
-.91612       -.92121       -.91362       -.89265       -.85839
-.81162       -.75371       -.68649       -.61203       -.53248
-.44988       -.36607       -.28256       -.20051       -.12075
-.43822E-01    .29958E-01    .10039        .16732        .23053
 .28973        .34453        .39438        .43871        .47689
 .50835        .53260        .54934        .55845        .56004
 .55443        .54215        .52390        .50048        .47280
 .44177        .40830        .37327        .33751        .30178
 .26681        .23324        .20170        .17275        .14690
 .12460        .10622        .92047E-01    .82238E-01    .76832E-01
 .75731E-01    .78705E-01    .85388E-01    .95322E-01    .10793
 .12259        .13865        .15543        .17226        .18852
 .20357        .21689        .22795        .23630        .24155
 .24338        .24157        .23602        .22673        .21387
 .19776        .17886        .15778        .13528        .11218
 .89333E-01    .67624E-01    .47859E-01    .30752E-01    .16877E-01
 .66622E-02    .36801E-03   -.18897E-02   -.12414E-03    .55527E-02
 .14978E-01    .27960E-01    .44299E-01    .63823E-01    .86373E-01
 .11179        .13990        .17046        .20316        .23757
 .27311        .30909        .34468        .37898        .41101
 .43981        .46447        .48415        .49816        .50594
 .50709        .50131        .48844        .46837        .44107
 .40653        .36476        .31589        .26010        .19773
 .12936        .55823E-01   -.21751E-01   -.10188       -.18283
-.26258       -.33903       -.41006       -.47375       -.52850
-.57321       -.60742       -.63136       -.64598       -.65287
-.65422       -.65251       -.65041       -.65044       -.65481
-.66510       -.68218       -.70609       -.73597       -.77021
-.80652       -.84216       -.87419       -.89970       -.91607
-.92122       -.91369       -.89279       -.85860       -.81189
-.75403       -.68687       -.61245       -.53293       -.45035
-.36655       -.28304       -.20098       -.12123       -.44282E-01
 .29507E-01    .99957E-01    .16689        .23013        .28936
 .34418        .39406        .43843        .47664        .50815
 .53245        .54925        .55841        .56005        .55450
 .54227        .52406        .50069        .47304        .44204
 .40859        .37357        .33781        .30209        .26711
 .23353        .20198        .17300        .14712        .12480
 .10638        .92170E-01    .82317E-01    .76874E-01    .75729E-01
 .78667E-01    .85316E-01    .95214E-01    .10779        .12244
 .13848        .15526        .17209        .18835        .20343
 .21676        .22785        .23623        .24151        .24338
 .24161        .23610        .22686        .21404        .19796
 .17909        .15804        .13555        .11245        .89604E-01
 .67878E-01    .48089E-01    .30942E-01    .17032E-01    .67658E-02
 .42495E-03   -.18847E-02   -.16894E-03    .54556E-02    .14833E-01
 .27762E-01    .44058E-01    .63535E-01    .86041E-01    .11142
 .13949        .17002        .20269        .23707        .27260
 .30857        .34417        .37849        .41056        .43941
 .46413        .48390        .49799        .50587        .50712
 .50145
 9.0000        85.470        86.380        78.970        76.080
 67.500        65.990        61.170        56.750        49.370
CASE  11  95KT.,OBS.4000FT.AHEAD(B1)
  361     12  .31566
 361.00        .10625        .11031        .11410        .11742
 .12009        .12202        .12322        .12383        .12403

 .12406        .12418        .12456        .12530        .12639
 .12769        .12902        .13010        .13069        .13061
 .12975        .12814        .12588        .12317        .12022
 .11725        .11439        .11168        .10908        .10644
 .10361        .10040        .96695E-01    .92448E-01    .87705E-01
 .82580E-01    .77220E-01    .71748E-01    .66208E-01    .60524E-01
 .54481E-01    .47744E-01    .39912E-01    .30598E-01    .19520E-01
 .65952E-02   -.80024E-02   -.23816E-01   -.40139E-01   -.56094E-01
-.70758E-01   -.83305E-01   -.93152E-01   -.10007       -.10425
-.10631       -.10720       -.10810       -.11026       -.11475
-.12238       -.13352       -.14803       -.16534       -.18444
-.20409       -.22295       -.23977       -.25351       -.26349
-.26940       -.27131       -.26960       -.26485       -.25774
-.24893       -.23898       -.22828       -.21709       -.20548
-.19346       -.18098       -.16804       -.15464       -.14092
-.12705       -.11326       -.99817E-01   -.86948E-01   -.74841E-01
-.63613E-01   -.53311E-01   -.43921E-01   -.35387E-01   -.27632E-01
-.20578E-01   -.14161E-01   -.83308E-02   -.30466E-02    .17333E-02
 .60633E-02    .10018E-01    .13695E-01    .17295E-01    .20657E-01
 .24143E-01    .27714E-01    .31373E-01    .35070E-01    .38707E-01
 .42154E-01    .45278E-01    .47964E-01    .50136E-01    .51777E-01
 .52926E-01    .53674E-01    .54150E-01    .54492E-01    .54835E-01
 .55283E-01    .55907E-01    .56736E-01    .57769E-01    .58982E-01
 .60345E-01    .61829E-01    .63417E-01    .65099E-01    .66874E-01
 .68735E-01    .70673E-01    .72661E-01    .74668E-01    .76658E-01
 .78607E-01    .80515E-01    .82413E-01    .84371E-01    .86483E-01
 .88855E-01    .91586E-01    .94730E-01    .98286E-01    .10218
 .10625        .11030        .11410        .11742        .12009
 .12202        .12322        .12383        .12403        .12406
 .12418        .12456        .12530        .12638        .12769
 .12901        .13010        .13069        .13061        .12975
 .12814        .12588        .12317        .12023        .11725
 .11439        .11168        .10908        .10644        .10361
 .10040        .96697E-01    .92451E-01    .87709E-01    .82584E-01
 .77223E-01    .71752E-01    .66212E-01    .60528E-01    .54486E-01
 .47750E-01    .39920E-01    .30606E-01    .19529E-01    .66056E-02
-.79908E-02   -.23804E-01   -.40127E-01   -.56083E-01   -.70748E-01
-.83296E-01   -.93145E-01   -.10006       -.10425       -.10630
-.10720       -.10810       -.11025       -.11474       -.12237
-.13349       -.14800       -.16530       -.18440       -.20405
-.22291       -.23973       -.25348       -.26346       -.26939
-.27131       -.26961       -.26487       -.25777       -.24897
-.23902       -.22833       -.21714       -.20553       -.19352
-.18105       -.16810       -.15471       -.14099       -.12712
-.11334       -.99893E-01   -.87023E-01   -.74912E-01   -.63680E-01
-.53374E-01   -.43980E-01   -.35441E-01   -.27682E-01   -.20625E-01
-.14205E-01   -.83712E-02   -.30840E-02    .16989E-02    .60313E-02
 .99888E-02    .13667E-01    .17177E-01    .20629E-01    .24113E-01
 .27683E-01    .31342E-01    .35039E-01    .38675E-01    .42125E-01
 .45252E-01    .47941E-01    .50119E-01    .51764E-01    .52918E-01
 .53670E-01    .54146E-01    .54490E-01    .54832E-01    .55279E-01
 .55900E-01    .56726E-01    .57757E-01    .58969E-01    .60330E-01
 .61813E-01    .63399E-01    .65079E-01    .66852E-01    .68713E-01
 .70649E-01    .72637E-01    .74643E-01    .76633E-01    .78582E-01
 .80490E-01    .82388E-01    .84344E-01    .86452E-01    .88821E-01
 .91545E-01    .94683E-01    .98232E-01    .10212        .10619
 .11025        .11405        .11737        .12005        .12199
 .12321        .12382        .12402        .12406        .12417
 .12455        .12528        .12636        .12767        .12899
 .13008        .13068        .13061        .12977        .12817
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Figure E-1-Continued.

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 .12592      .12322      .12028      .11731      .11444
 .11173      .10913      .10650      .10367      .10047
 .96774E-01  .92539E-01  .87806E-01  .82688E-01  .77332E-01
 .71863E-01  .66325E-01  .60647E-01  .54616E-01  .47899E-01
 .40097E-01  .30819E-01  .19784E-01  .69003E-02 -.76604E-02
-.23451E-01 -.39770E-01 -.55741E-01 -.70443E-01 -.83044E-01
-.92955E-01 -.99939E-01 -.10418     -.10627     -.10718
-.10807     -.11018     -.11461     -.12215     -.13320
-.14764     -.16488     -.18395     -.20360     -.22250
-.23937     -.25320     -.26328     -.26929     -.27131
-.26969
 11.000      77.520      70.430      61.110      54.300
 54.240      52.470      50.250      50.430      44.999
 43.940      39.020
CASE  12  160KT.,OBS.4000FT.AHEAD(B1)
  361    11  .28935
 361.00      .21315E-01  .37651E-01  .52991E-01  .67050E-01
 .79536E-01  .90160E-01  .98646E-01  .10474      .10824
 .10899      .10688      .10185      .93828E-01  .82724E-01
 .68372E-01  .50503E-01  .28735E-01  .25965E-02 -.28414E-01
-.64736E-01 -.10661     -.15395     -.20619     -.26217
-.32013     -.37766     -.43185     -.47944     -.51711
-.54176     -.55081     -.54251     -.51617     -.47225
-.41242     -.33941     -.25684     -.16885     -.79760E-01
 .62834E-02  .85670E-01  .15559     .21418      .26063
 .29506      .31840      .33220      .33832      .33874
 .33532      .32965      .32301      .31628      .31005
 .30468      .30035      .29717      .29526      .29468
 .29549      .29770      .30117      .30561      .31056
 .31539      .31937      .32175      .32190      .31936
 .31400      .30602      .29598      .28476      .27342
 .26310      .25489      .24964      .24791      .24989
 .25542      .26403      .27502      .28761      .30106
 .31471      .32807      .34079      .35262      .36327
 .37235      .37920      .38285      .38199      .37503
 .36021      .33581      .30036      .25289      .19315
 .12173      .40182E-01 -.49068E-01 -.14283     -.23738
-.32876     -.41312     -.48701     -.54767     -.59322
-.62281     -.63657     -.63554     -.62153     -.59686
-.56413     -.52603     -.48504     -.44337     -.40281
-.36470     -.32993     -.29901     -.27212     -.24918
-.22994     -.21399     -.20088     -.19009     -.18105
-.17320     -.16598     -.15884     -.15129     -.14291
-.13338     -.12248     -.11013     -.96352E-01 -.81291E-01
-.65159E-01 -.48230E-01 -.30812E-01 -.13213E-01  .42588E-02
 .21306E-01  .37642E-01  .52984E-01  .67042E-01  .79531E-01
 .90159E-01  .98643E-01  .10474      .10824      .10899
 .10689      .10186      .93838E-01  .82735E-01  .68383E-01
 .50519E-01  .28752E-01  .26175E-02 -.28391E-01 -.64710E-01
-.10658     -.15392     -.20615     -.26214     -.32010
-.37763     -.43182     -.47941     -.51709     -.54175
-.55081     -.54252     -.51619     -.47228     -.41246
-.33947     -.25690     -.16891     -.79816E-01  .62307E-02
 .85620E-01  .15554      .21415      .26060      .29504
 .31839      .33219      .33832      .33874      .33532
 .32965      .32301      .31628      .31006      .30468
 .30035      .29718      .29526      .29468      .29549
 .29770      .30117      .30561      .31056      .31539
 .31937      .32176      .32190      .31937      .31400
 .30602      .29599      .28477      .27342      .26311
 .25489      .24964      .24790      .24989      .25541
 .26401      .27499      .28759      .30103      .31468
 .32804      .34076      .35259      .36325      .37233
 .37918      .38284      .38200      .37506      .36027
 .33590      .30049      .25307      .19337      .12200
 .40487E-01 -.48732E-01 -.14247     -.23702     -.32841
-.41280     -.48673     -.54744     -.59306     -.62271
-.63654     -.63557     -.62162     -.59699     -.56431
-.52623     -.48525     -.44359     -.40302     -.36490
-.33011     -.29917     -.27227     -.24931     -.23004
-.21408     -.20096     -.19015     -.18110     -.17325
-.16603     -.15889     -.15134     -.14297     -.13345
-.12257     -.11022     -.96462E-01 -.81409E-01 -.65285E-01
-.48363E-01 -.30949E-01 -.13351E-01  .41212E-02  .21172E-01
 .37515E-01  .52863E-01  .66933E-01  .79437E-01  .90078E-01
 .98584E-01  .10470      .10823      .10900      .10692
 .10192      .93929E-01  .82856E-01  .68539E-01  .50709E-01
 .28987E-01  .28970E-02 -.28055E-01 -.64318E-01 -.10613
-.15341     -.20559     -.26154     -.31948     -.37703
-.43126     -.47895     -.51675     -.54156     -.55080
-.54272     -.51659     -.47288     -.41323     -.34037
-.25791     -.16996     -.80868E-01  .52276E-02  .84709E-01
 .15475      .21350      .26010      .29467      .31816
 .33207      .33828      .33876      .33538      .32974
 .32310      .31637      .31014      .30475      .30040
 .29721      .29528      .29468      .29547      .29766
 .30111      .30554      .31049      .31532      .31932
 .32173      .32192      .31942      .31411      .30616
 .29615
 10.000      82.320      81.560      78.930      76.640
 73.870      70.040      63.150      58.130      53.620
 50.160
CASE  13  100KT.,OBS.1000FT.AHEAD(A)
  361    12  .30193
 361.00      .94631E-01  .93103E-01  .94448E-01  .97092E-01
 .99220E-01  .99210E-01  .96030E-01  .89483E-01  .80275E-01
 .69852E-01  .60078E-01  .52801E-01  .49423E-01  .50563E-01
 .55901E-01  .64230E-01  .73712E-01  .82283E-01  .88109E-01
 .89992E-01  .87637E-01  .81708E-01  .73667E-01  .65429E-01
 .58904E-01  .55541E-01  .55967E-01  .59812E-01  .65763E-01
 .71834E-01  .75795E-01  .75675E-01  .70205E-01  .59136E-01
 .43315E-01  .24547E-01  .52281E-02 -.12136E-01 -.25443E-01
-.33420E-01 -.35857E-01 -.33618E-01 -.28405E-01 -.22351E-01
-.17511E-01 -.15386E-01 -.16578E-01 -.20655E-01 -.26259E-01
-.31443E-01 -.34145E-01 -.32715E-01 -.26364E-01 -.15429E-01
-.14161E-02  .13225E-01  .25518E-01  .32507E-01  .31793E-01
 .21974E-01  .28715E-02 -.24482E-01 -.58098E-01 -.95458E-01
-.13403     -.17172     -.20725     -.24025     -.27115
-.30091     -.33055     -.36076     -.39147     -.42175
-.44979     -.47322     -.48953     -.49652     -.49286
-.47831     -.45390     -.42172     -.38463     -.34571
-.30775     -.27279     -.24183     -.21478     -.19062
-.16776     -.14450     -.11951     -.92156E-01 -.62690E-01
-.32187E-01 -.23024E-02  .25120E-01  .48482E-01  .66810E-01
 .79993E-01  .88813E-01  .94771E-01  .99752E-01  .10559
 .11366      .12455      .13793      .15266      .16701
 .17911      .18736      .19082      .18946      .18417
 .17655      .16865      .16244      .15942      .16029
 .16482      .17188      .17974      .18645      .19033
 .19028      .18612      .17857      .16910      .15961
```

Figure E-1-Continued.

```
 .15198       .14762       .14720       .15039       .15605
 .16236       .16732       .16914       .16667       .15963
 .14870       .13536       .12155       .10923       .99983E-01
 .94632E-01   .93103E-01   .94447E-01   .97090E-01   .99219E-01
 .99211E-01   .96033E-01   .89488E-01   .80282E-01   .69859E-01
 .60084E-01   .52805E-01   .49423E-01   .50561E-01   .55896E-01
 .64224E-01   .73706E-01   .82278E-01   .88107E-01   .89993E-01
 .87641E-01   .81713E-01   .73673E-01   .65434E-01   .58908E-01
 .55543E-01   .55965E-01   .59809E-01   .65759E-01   .71830E-01
 .75795E-01   .75677E-01   .70212E-01   .59144E-01   .43327E-01
 .24559E-01   .52401E-02  -.12126E-01  -.25437E-01  -.33417E-01
-.35859E-01  -.33622E-01  -.28410E-01  -.22357E-01  -.17515E-01
-.15388E-01  -.16578E-01  -.20654E-01  -.26258E-01  -.31442E-01
-.34147E-01  -.32720E-01  -.26371E-01  -.15439E-01  -.14261E-02
 .13216E-01   .25513E-01   .32506E-01   .31798E-01   .21986E-01
 .28902E-02  -.24458E-01  -.58073E-01  -.95430E-01  -.13399
-.17169      -.20721      -.24021      -.27111      -.30087
-.33051      -.36071      -.39142      -.42169      -.44974
-.47318      -.48950      -.49652      -.49288      -.47836
-.45397      -.42182      -.38474      -.34582      -.30786
-.27289      -.24192      -.21487      -.19070      -.16784
-.14459      -.11961      -.92267E-01  -.62812E-01  -.32314E-01
-.24259E-02   .25007E-01   .48388E-01   .66737E-01   .79942E-01
 .88777E-01   .94744E-01   .99726E-01   .10556       .11361
 .12448       .13786       .15258       .16693       .17905
 .18732       .19082       .18949       .18421       .17661
 .16870       .16247       .15943       .16028       .16478
 .17183       .17969       .18642       .19031       .19030
 .18617       .17863       .16917       .15968       .15203
 .14765       .14719       .15036       .15599       .16231
 .16729       .16914       .16671       .15971       .14882
 .13549       .12167       .10934       .10005       .94665E-01
 .93102E-01   .94423E-01   .97064E-01   .99206E-01   .99226E-01
 .96082E-01   .89571E-01   .80387E-01   .69969E-01   .60178E-01
 .52864E-01   .49435E-01   .50523E-01   .55817E-01   .64119E-01
 .73598E-01   .82192E-01   .88059E-01   .89993E-01   .87691E-01
 .81798E-01   .73773E-01   .65527E-01   .58968E-01   .55560E-01
 .55936E-01   .59743E-01   .65677E-01   .71759E-01   .75764E-01
 .75708E-01   .70318E-01   .59324E-01   .43561E-01   .24820E-01
 .54942E-02  -.11913E-01  -.25289E-01  -.33347E-01  -.35859E-01
-.33677E-01  -.28495E-01  -.22440E-01  -.17568E-01  -.15395E-01
-.16536E-01  -.20578E-01  -.26172E-01  -.31377E-01  -.34132E-01
-.32776E-01  -.26505E-01  -.15635E-01  -.16547E-02   .12998E-01
 .25354E-01   .32449E-01   .31880E-01   .22221E-01   .32711E-02
-.23954E-01  -.57479E-01  -.94791E-01  -.13335      -.17107
-.20664      -.23968      -.27061      -.30037      -.33001
-.36020
 11.000       79.720       76.090       71.370       69.650
 63.490       56.520       45.929       39.910       36.190
 42.670       59.790
CASE  14  100KT.,OBS.2000FT.AHEAD(A)
  361     12  .30193
 361.00       .68947E-01   .81765E-01   .89159E-01   .89857E-01
 .84272E-01   .74419E-01   .63446E-01   .54913E-01   .51960E-01
 .56563E-01   .69052E-01   .87980E-01   .11040       .13246
 .15022       .16050       .16150       .15321       .13737
 .11702       .95895E-01   .77521E-01   .64508E-01   .57995E-01
 .57462E-01   .60926E-01   .65472E-01   .67995E-01   .65981E-01
 .58148E-01   .44793E-01   .27771E-01   .10100E-01  -.47105E-02
-.13468E-01  -.14043E-01  -.58962E-02   .97478E-02   .30111E-01

 .51426E-01   .69725E-01   .81674E-01   .85280E-01   .80301E-01
 .68275E-01   .52158E-01   .35653E-01   .22378E-01   .15059E-01
 .14926E-01   .21453E-01   .32484E-01   .44732E-01   .54526E-01
 .58650E-01   .55068E-01   .43402E-01   .25024E-01   .27675E-02
-.19681E-01  -.38582E-01  -.50949E-01  -.55176E-01  -.51360E-01
-.41238E-01  -.27769E-01  -.14441E-01  -.44820E-02  -.13404E-03
-.21702E-02  -.97497E-02  -.20648E-01  -.31805E-01  -.40062E-01
-.42929E-01  -.39190E-01  -.29225E-01  -.14978E-01   .44519E-03
 .13421E-01   .20585E-01   .19540E-01   .93556E-02  -.92595E-02
-.34140E-01  -.62159E-01  -.89911E-01  -.11444      -.13382
-.14750      -.15627      -.16196      -.16686      -.17305
-.18180      -.19317      -.20595      -.21785      -.22611
-.22812      -.22213      -.20773      -.18613      -.15995
-.13275      -.10837      -.90052E-01  -.79804E-01  -.77910E-01
-.82861E-01  -.91661E-01  -.10045      -.10534      -.10323
-.92525E-01  -.73444E-01  -.48007E-01  -.19591E-01   .77878E-02
 .30341E-01   .45313E-01   .51561E-01   .49773E-01   .42285E-01
 .32532E-01   .24265E-01   .20700E-01   .23799E-01   .33834E-01
 .49338E-01   .67443E-01   .84543E-01   .97115E-01   .10252
 .99622E-01   .89034E-01   .73014E-01   .54962E-01   .38673E-01
 .27513E-01   .23674E-01   .27720E-01   .38484E-01   .53365E-01
 .68937E-01   .81758E-01   .89156E-01   .89858E-01   .84277E-01
 .74425E-01   .63453E-01   .54917E-01   .51959E-01   .56557E-01
 .69041E-01   .87965E-01   .11038       .13244       .15021
 .16049       .16150       .15322       .13738       .11704
 .95909E-01   .77532E-01   .64515E-01   .57998E-01   .57461E-01
 .60923E-01   .65470E-01   .67995E-01   .65985E-01   .58156E-01
 .44804E-01   .27783E-01   .10112E-01  -.47021E-02  -.13465E-01
-.14046E-01  -.59044E-02   .97352E-02   .30097E-01   .51412E-01
 .69714E-01   .81668E-01   .85279E-01   .80306E-01   .68283E-01
 .52168E-01   .35662E-01   .22385E-01   .15061E-01   .14923E-01
 .21447E-01   .32476E-01   .44724E-01   .54521E-01   .58649E-01
 .55072E-01   .43411E-01   .25037E-01   .27817E-02  -.19668E-01
-.38573E-01  -.50944E-01  -.55177E-01  -.51365E-01  -.41248E-01
-.27781E-01  -.14453E-01  -.44906E-02  -.13608E-03  -.21646E-02
-.97370E-02  -.20632E-01  -.31789E-01  -.40053E-01  -.42931E-01
-.39203E-01  -.29251E-01  -.15010E-01   .41275E-03   .13397E-01
 .20577E-01   .19555E-01   .93962E-02  -.91964E-02  -.34060E-01
-.62071E-01  -.89826E-01  -.11437      -.13376      -.14746
-.15624      -.16194      -.16684      -.17302      -.18176
-.19312      -.20589      -.21781      -.22609      -.22813
-.22218      -.20782      -.18625      -.16008      -.13289
-.10848      -.90130E-01  -.79838E-01  -.77900E-01  -.82820E-01
-.91608E-01  -.10041      -.10533      -.10327      -.92620E-01
-.73591E-01  -.48187E-01  -.19780E-01   .76162E-02   .30210E-01
 .45239E-01   .51546E-01   .49808E-01   .42351E-01   .32602E-01
 .24312E-01   .20703E-01   .23748E-01   .33732E-01   .49201E-01
 .67297E-01   .84418E-01   .97038E-01   .10251       .99681E-01
 .89153E-01   .73168E-01   .55119E-01   .38801E-01   .27583E-01
 .23673E-01   .27649E-01   .38360E-01   .53216E-01   .68797E-01
 .81658E-01   .89117E-01   .89885E-01   .84358E-01   .74537E-01
 .63558E-01   .54982E-01   .51954E-01   .56467E-01   .68870E-01
 .87737E-01   .11013       .13222       .15005       .16043
 .16154       .15336       .13760       .11729       .96148E-01
 .77723E-01   .64634E-01   .58038E-01   .57439E-01   .60867E-01
 .65420E-01   .67988E-01   .66046E-01   .58293E-01   .45005E-01
 .28016E-01   .10333E-01  -.45400E-02  -.13399E-01  -.14097E-01
-.60698E-02   .94820E-02   .29800E-01   .51128E-01   .69495E-01
 .81555E-01   .85290E-01   .80433E-01   .68495E-01   .52415E-01
 .35890E-01   .22542E-01   .15118E-01   .14872E-01   .21308E-01
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Figure E-1-Continued.

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 .32289E-01  .44545E-01  .54405E-01  .58639E-01  .55192E-01
 .43653E-01  .25368E-01  .31497E-02 -.19325E-01 -.38312E-01
-.50806E-01 -.55176E-01 -.51486E-01 -.41451E-01 -.28014E-01
-.14655E-01 -.46141E-02 -.15566E-03 -.20802E-02 -.95760E-02
-.20439E-01
 11.000      74.050      66.990      63.210      64.040
 60.770      52.570      52.780      46.409      47.780
 43.020      64.400
CASE  15  100KT.,OBS.4000FT.AHEAD(A)
  361    12   .30193
 361.00      .23891E-02 -.36545E-03 -.33148E-02 -.58534E-02
-.73875E-02 -.74738E-02 -.59221E-02 -.28382E-02  .14040E-02
 .62537E-02  .11115E-01  .15490E-01  .19090E-01  .21905E-01
 .24189E-01  .26384E-01  .28995E-01  .32438E-01  .36907E-01
 .42291E-01  .48160E-01  .53826E-01  .58482E-01  .61365E-01
 .61928E-01  .59973E-01  .55712E-01  .49744E-01  .42949E-01
 .36317E-01  .30751E-01  .26888E-01  .24978E-01  .24837E-01
 .25903E-01  .27370E-01  .28378E-01  .28213E-01  .26477E-01
 .23192E-01  .18802E-01  .14095E-01  .10037E-01  .75688E-02
 .74078E-02  .98925E-02  .14908E-01  .21903E-01  .30003E-01
 .38181E-01  .45459E-01  .51089E-01  .54681E-01  .56248E-01
 .56153E-01  .54994E-01  .53432E-01  .52018E-01  .51051E-01
 .50516E-01  .50086E-01  .49225E-01  .47328E-01  .43898E-01
 .38695E-01  .31827E-01  .23761E-01  .15251E-01  .71909E-02
 .43184E-03 -.43980E-02 -.70294E-02 -.76103E-02 -.66721E-02
-.50093E-02 -.35003E-02 -.29061E-02 -.36953E-02 -.59348E-02
-.92735E-02 -.13023E-01 -.16320E-01 -.18339E-01 -.18499E-01
-.16628E-01 -.13037E-01 -.84920E-02 -.40824E-02 -.10101E-02
-.34863E-03 -.28177E-02 -.86251E-02 -.17410E-01 -.28301E-01
-.40075E-01 -.51394E-01 -.61057E-01 -.68228E-01 -.72576E-01
-.74323E-01 -.74167E-01 -.73104E-01 -.72207E-01 -.72378E-01
-.74153E-01 -.77589E-01 -.82253E-01 -.87325E-01 -.91782E-01
-.94615E-01 -.95054E-01 -.92726E-01 -.87731E-01 -.80612E-01
-.72229E-01 -.63578E-01 -.55569E-01 -.48848E-01 -.43672E-01
-.39875E-01 -.36942E-01 -.34140E-01 -.30717E-01 -.26085E-01
-.19974E-01 -.12505E-01 -.41757E-02  .42391E-02  .11850E-01
 .17840E-01  .21634E-01  .23011E-01  .22147E-01  .19561E-01
 .15998E-01  .12262E-01  .90492E-02  .68104E-02  .56759E-02
 .54593E-02  .57331E-02  .59605E-02  .56466E-02  .44736E-02
 .23910E-02 -.36331E-03 -.33128E-02 -.58519E-02 -.73868E-02
-.74741E-02 -.59236E-02 -.28407E-02  .14009E-02  .62503E-02
 .11112E-01  .15487E-01  .19088E-01  .21904E-01  .24187E-01
 .26382E-01  .28992E-01  .32435E-01  .36904E-01  .42288E-01
 .48155E-01  .53823E-01  .58480E-01  .61364E-01  .61929E-01
 .59975E-01  .55715E-01  .49749E-01  .42954E-01  .36321E-01
 .30754E-01  .26891E-01  .24980E-01  .24837E-01  .25903E-01
 .27370E-01  .28378E-01  .28214E-01  .26479E-01  .23194E-01
 .18805E-01  .14098E-01  .10039E-01  .75695E-02  .74066E-02
 .98895E-02  .14903E-01  .21898E-01  .29997E-01  .38176E-01
 .45454E-01  .51085E-01  .54679E-01  .56246E-01  .56153E-01
 .54995E-01  .53433E-01  .52018E-01  .51051E-01  .50516E-01
 .50087E-01  .49225E-01  .47329E-01  .43901E-01  .38700E-01
 .31834E-01  .23769E-01  .15260E-01  .71994E-02  .43918E-03
-.43930E-02 -.70270E-02 -.76107E-02 -.66743E-02 -.50123E-02
-.35025E-02 -.29061E-02 -.36919E-02 -.59284E-02 -.92648E-02
-.13013E-01 -.16313E-01 -.18336E-01 -.18501E-01 -.16636E-01
-.13049E-01 -.85065E-02 -.40948E-02 -.10167E-02 -.34532E-03
-.28023E-02 -.85973E-02 -.17372E-01 -.28255E-01 -.40027E-01
-.51349E-01 -.61021E-01 -.68202E-01 -.72562E-01 -.74320E-01
-.74170E-01 -.73109E-01 -.72209E-01 -.72373E-01 -.74140E-01
-.77567E-01 -.82226E-01 -.87299E-01 -.91761E-01 -.94605E-01
-.95060E-01 -.92749E-01 -.87769E-01 -.80661E-01 -.72284E-01
-.63632E-01 -.55618E-01 -.48888E-01 -.43702E-01 -.39898E-01
-.36961E-01 -.34162E-01 -.30746E-01 -.26124E-01 -.20025E-01
-.12565E-01 -.42407E-02  .41761E-02  .11796E-01  .17801E-01
 .21612E-01  .23009E-01  .22162E-01  .19587E-01  .16030E-01
 .12292E-01  .90733E-02  .68252E-02  .56815E-02  .54583E-02
 .57301E-02  .59608E-02  .56537E-02  .44893E-02  .24149E-02
-.33455E-03 -.32845E-02 -.58303E-02 -.73778E-02 -.74810E-02
-.59474E-02 -.28789E-02  .13529E-02  .61985E-02  .11063E-01
 .15444E-01  .19054E-01  .21876E-01  .24163E-01  .26356E-01
 .28959E-01  .32390E-01  .36846E-01  .42221E-01  .48086E-01
 .53760E-01  .58433E-01  .61342E-01  .61937E-01  .60014E-01
 .55781E-01  .49831E-01  .43041E-01  .36401E-01  .30816E-01
 .26928E-01  .24992E-01  .24830E-01  .25884E-01  .27351E-01
 .28371E-01  .28226E-01  .26514E-01  .23249E-01  .18871E-01
 .14163E-01  .10088E-01  .75900E-02  .73905E-02  .98345E-02
 .14813E-01  .21784E-01  .29874E-01  .38057E-01  .45354E-01
 .51014E-01  .54639E-01  .56236E-01  .56164E-01  .55018E-01
 .53457E-01  .52037E-01  .51063E-01  .50522E-01  .50095E-01
 .49246E-01  .47372E-01  .43972E-01  .38801E-01  .31959E-01
 .23909E-01  .15400E-01  .73249E-02  .53705E-03 -.43304E-02
-.70011E-02
 11.000      67.530      59.220      53.940      60.750
 48.480      39.530      29.670      41.770      43.131
 40.790      51.920
CASE  16  140KT.,OBS.1000FT.AHEAD(A)
  361    11   .27778
 361.00      .42492E-01  .64487E-01  .87203E-01  .10941
 .12989      .14755      .16147      .17097      .17563
 .17526      .16988      .15970      .14501      .12620
 .10367      .77869E-01  .49248E-01  .18328E-01 -.14289E-01
-.47878E-01 -.81569E-01 -.11434     -.14503     -.17241
-.19521     -.21225     -.22253     -.22530     -.22019
-.20721     -.18683     -.15994     -.12782     -.92068E-01
-.54519E-01 -.17124E-01  .18142E-01  .49386E-01  .74890E-01
 .93188E-01  .10313      .10394      .95217E-01  .76998E-01
 .49722E-01  .14234E-01 -.28257E-01 -.76232E-01 -.12794
-.18148     -.23495     -.28653     -.33463     -.37798
-.41572     -.44746     -.47326     -.49362     -.50936
-.52148     -.53108     -.53913     -.54636     -.55317
-.55949     -.56485     -.56835     -.56878     -.56474
-.55480     -.53762     -.51215     -.47766     -.43390
-.38107     -.31983     -.25123     -.17663     -.97648E-01
-.15998E-01  .66542E-01  .14822      .22738      .30244
 .37198      .43470      .48948      .53533      .57148
 .59737      .61269      .61739      .61176      .59637
 .57209      .54007      .50167      .45842      .41190
 .36371      .31538      .26830      .22372      .18268
 .14601      .11436      .88164E-01  .67710E-01  .53093E-01
 .44241E-01  .40923E-01  .42731E-01  .49094E-01  .59274E-01
 .72392E-01  .87459E-01  .10341      .11919      .13377
 .14625      .15591      .16221      .16486      .16378
 .15911      .15113      .14028      .12704      .11195
 .95538E-01  .78326E-01  .60837E-01  .43588E-01  .27120E-01
 .11999E-01 -.11791E-02 -.11791E-01 -.19231E-01 -.22948E-01
-.22508E-01 -.17650E-01 -.83450E-02  .51701E-02  .22372E-01
 .42475E-01  .64469E-01  .87184E-01  .10939      .12987
 .14753      .16146      .17097      .17563      .17526
 .16990      .15971      .14503      .12622      .10370
```

Figure E-1-Continued.

```
 .77895E-01  .49277E-01  .18357E-01 -.14259E-01 -.47849E-01
-.81542E-01 -.11431     -.14501     -.17239     -.19520
-.21225     -.22253     -.22531     -.22020     -.20723
-.18685     -.15997     -.12785     -.92105E-01 -.54556E-01
-.17160E-01  .18110E-01  .49358E-01  .74868E-01  .93174E-01
 .10313      .10394      .95230E-01  .77018E-01  .49749E-01
 .14269E-01 -.28217E-01 -.76186E-01 -.12789     -.18143
-.23490     -.28649     -.33459     -.37794     -.41568
-.44743     -.47324     -.49360     -.50934     -.52147
-.53107     -.53912     -.54635     -.55316     -.55948
-.56484     -.56835     -.56878     -.56475     -.55481
-.53765     -.51217     -.47770     -.43395     -.38113
-.31989     -.25129     -.17670     -.97719E-01 -.16073E-01
 .66469E-01  .14815      .22729      .30235      .37190
 .43463      .48941      .53527      .57144      .59734
 .61267      .61740      .61178      .59640      .57214
 .54014      .50176      .45851      .41200      .36382
 .31549      .26841      .22383      .18278      .14610
 .11443      .88231E-01  .67761E-01  .53130E-01  .44263E-01
 .40927E-01  .42722E-01  .49072E-01  .59239E-01  .72349E-01
 .87410E-01  .10336      .11914      .13372      .14621
 .15588      .16220      .16486      .16379      .15913
 .15117      .14033      .12710      .11201      .95605E-01
 .78400E-01  .60910E-01  .43662E-01  .27191E-01  .12061E-01
-.11251E-02 -.11750E-01 -.19206E-01 -.22941E-01 -.22521E-01
-.17687E-01 -.84036E-02  .50910E-02  .22273E-01  .42363E-01
 .64350E-01  .87061E-01  .10927      .12977      .14744
 .16139      .17093      .17562      .17528      .16994
 .15978      .14513      .12634      .10384      .78062E-01
 .49462E-01  .18559E-01 -.14046E-01 -.47630E-01 -.81322E-01
-.11410     -.14482     -.17222     -.19506     -.21215
-.22248     -.22531     -.22026     -.20735     -.18702
-.16018     -.12810     -.92375E-01 -.54837E-01 -.17435E-01
 .17856E-01  .49141E-01  .74698E-01  .93064E-01  .10308
 .10397      .95338E-01  .77203E-01  .50006E-01  .14592E-01
-.27839E-01 -.75769E-01 -.12744     -.18098     -.23446
-.28606     -.33419     -.37758     -.41538     -.44717
-.47304     -.49344     -.50922     -.52137     -.53099
-.53905     -.54629     -.55310     -.55943     -.56480
-.56832     -.56880     -.56482     -.55494     -.53786
-.51247
 10.000      81.490      80.670      80.030      76.830
 71.340      64.510      57.440      50.500      30.360
 43.349
CASE  17  140KT.,OBS.2000FT.AHEAD(A)
  361    11  .27778
 361.00      .16175      .15408      .14564      .13669
 .12763      .11894      .11120      .10502      .10095
 .99423E-01  .10064      .10453      .11075      .11863
 .12731      .13574      .14285      .14764      .14930
 .14731      .14147      .13193      .11919      .10395
 .87107E-01  .69584E-01  .52267E-01  .35911E-01  .21096E-01
 .82013E-02 -.25698E-02 -.11156E-01 -.17587E-01 -.21928E-01
-.24249E-01 -.24610E-01 -.23074E-01 -.19751E-01 -.14852E-01
-.87531E-02 -.20406E-02  .44615E-02  .97098E-02  .12500E-01
 .11568E-01  .57255E-02 -.59872E-02 -.24154E-01 -.48861E-01
-.79614E-01 -.11532     -.15436     -.19464     -.23386
-.26963     -.29973     -.32230     -.33601     -.34019
-.33481     -.32051     -.29846     -.27022     -.23756
-.20230     -.16609     -.13033     -.96016E-01 -.63785E-01
```

```
-.33882E-01 -.62418E-02  .19410E-01  .43445E-01  .66220E-01
 .87978E-01  .10877      .12843      .14655      .16253
 .17561      .18498      .18982      .18940      .18318
 .17083      .15232      .12791      .98167E-01  .63953E-01
 .26386E-01 -.13213E-01 -.53391E-01 -.92633E-01 -.12946
-.16248     -.19053     -.21268     -.22832     -.23716
-.23929     -.23510     -.22529     -.21078     -.19264
-.17202     -.15007     -.12789     -.10644     -.86527E-01
-.68760E-01 -.53567E-01 -.41178E-01 -.31648E-01 -.24864E-01
-.20568E-01 -.18374E-01 -.17786E-01 -.18219E-01 -.19028E-01
-.19530E-01 -.19053E-01 -.16969E-01 -.12750E-01 -.60132E-02
 .34478E-02  .15621E-01  .30278E-01  .46980E-01  .65111E-01
 .83938E-01  .10267      .12052      .13682      .15102
 .16275      .17185      .17831      .18230      .18406
 .18387      .18201      .17872      .17417      .16849
 .16175      .15408      .14564      .13670      .12764
 .11894      .11120      .10502      .10096      .99424E-01
 .10063      .10452      .11074      .11863      .12730
 .13574      .14285      .14764      .14930      .14731
 .14147      .13194      .11920      .10397      .87121E-01
 .69598E-01  .52280E-01  .35924E-01  .21107E-01  .82116E-02
-.25620E-02 -.11150E-01 -.17584E-01 -.21927E-01 -.24250E-01
-.24611E-01 -.23077E-01 -.19755E-01 -.14858E-01 -.87596E-02
-.20461E-02  .44567E-02  .97065E-02  .12499E-01  .11570E-01
 .57333E-02 -.59745E-02 -.24135E-01 -.48837E-01 -.79585E-01
-.11529     -.15432     -.19461     -.23383     -.26961
-.29971     -.32228     -.33601     -.34019     -.33482
-.32053     -.29848     -.27025     -.23759     -.20233
-.16613     -.13036     -.96047E-01 -.63815E-01 -.33911E-01
-.62683E-02  .19385E-01  .43421E-01  .66198E-01  .87956E-01
 .10875      .12841      .14654      .16252      .17560
 .18498      .18982      .18941      .18319      .17085
 .15235      .12795      .98214E-01  .64008E-01  .26446E-01
-.13148E-01 -.53324E-01 -.92568E-01 -.12939     -.16243
-.19049     -.21264     -.22829     -.23714     -.23928
-.23511     -.22532     -.21081     -.19268     -.17207
-.15013     -.12795     -.10650     -.86578E-01 -.68806E-01
-.53606E-01 -.41210E-01 -.31673E-01 -.24881E-01 -.20578E-01
-.18379E-01 -.17786E-01 -.18218E-01 -.19027E-01 -.19531E-01
-.19058E-01 -.16982E-01 -.12772E-01 -.60446E-02  .34046E-02
 .15567E-01  .30214E-01  .46907E-01  .65033E-01  .83858E-01
 .10259      .12045      .13675      .15096      .16270
 .17181      .17829      .18229      .18405      .18387
 .18202      .17874      .17420      .16852      .16179
 .15412      .14569      .13675      .12768      .11899
 .11124      .10505      .10097      .99424E-01  .10062
 .10450      .11070      .11858      .12725      .13569
 .14281      .14762      .14931      .14734      .14152
 .13202      .11930      .10408      .87240E-01  .69720E-01
 .52398E-01  .36035E-01  .21205E-01  .82957E-02 -.24914E-02
-.11096E-01 -.17543E-01 -.21900E-01 -.24239E-01 -.24615E-01
-.23095E-01 -.19785E-01 -.14900E-01 -.88088E-02 -.20985E-02
 .44090E-02  .96731E-02  .12490E-01  .11597E-01  .58044E-02
-.58507E-02 -.23956E-01 -.48603E-01 -.79301E-01 -.11497
-.15398     -.19426     -.23350     -.26931     -.29947
-.32212     -.33592     -.34020     -.33491     -.32070
-.29872     -.27053     -.23791     -.20267     -.16647
-.13070     -.96370E-01 -.64118E-01 -.34192E-01 -.65317E-02
 .19138E-01
 10.000      74.380      73.930      74.010      71.200
```

Figure E-1-Continued.

```
 68.530      63.490      59.860      51.260      50.370
 43.440
CASE  18  140KT.,OBS.4000FT.AHEAD(A)
  361    11   .27778
 361.00     -.57324E-01 -.58454E-01 -.60350E-01 -.62797E-01
-.65476E-01 -.68026E-01 -.70103E-01 -.71440E-01 -.71888E-01
-.71433E-01 -.70189E-01 -.68362E-01 -.66206E-01 -.63958E-01
-.61793E-01 -.59775E-01 -.57849E-01 -.55839E-01 -.53486E-01
-.50496E-01 -.46596E-01 -.41596E-01 -.35431E-01 -.28183E-01
-.20081E-01 -.11476E-01 -.27903E-02  .55435E-02  .13143E-01
 .19729E-01  .25169E-01  .29482E-01  .32832E-01  .35492E-01
 .37798E-01  .40089E-01  .42655E-01  .45697E-01  .49305E-01
 .53455E-01  .58024E-01  .62827E-01  .67656E-01  .72316E-01
 .76661E-01  .80607E-01  .84136E-01  .87285E-01  .90114E-01
 .92681E-01  .95016E-01  .97098E-01  .98851E-01  .10015
 .10085      .10080      .99884E-01  .98058E-01  .95348E-01
 .91861E-01  .87771E-01  .83293E-01  .78649E-01  .74034E-01
 .69583E-01  .65359E-01  .61346E-01  .57469E-01  .53620E-01
 .49696E-01  .45633E-01  .41439E-01  .37207E-01  .33112E-01
 .29389E-01  .26299E-01  .24076E-01  .22887E-01  .22789E-01
 .23708E-01  .25439E-01  .27670E-01  .30022E-01  .32104E-01
 .33576E-01  .34195E-01  .33858E-01  .32608E-01  .30627E-01
 .28192E-01  .25628E-01  .23239E-01  .21251E-01  .19769E-01
 .18749E-01  .18008E-01  .17254E-01  .16136E-01  .14309E-01
 .11503E-01  .75701E-02  .25220E-02 -.34696E-02 -.10095E-01
-.16955E-01 -.23627E-01 -.29734E-01 -.35003E-01 -.39311E-01
-.42697E-01 -.45346E-01 -.47551E-01 -.49647E-01 -.51944E-01
-.54658E-01 -.57868E-01 -.61489E-01 -.65279E-01 -.68885E-01
-.71893E-01 -.73913E-01 -.74646E-01 -.73946E-01 -.71853E-01
-.68599E-01 -.64580E-01 -.60295E-01 -.56276E-01 -.53000E-01
-.50825E-01 -.49932E-01 -.50303E-01 -.51735E-01 -.53877E-01
-.56298E-01 -.58561E-01 -.60300E-01 -.61277E-01 -.61422E-01
-.60834E-01 -.59756E-01 -.58527E-01 -.57512E-01 -.57037E-01
-.57323E-01 -.58452E-01 -.60348E-01 -.62794E-01 -.65474E-01
-.68024E-01 -.70101E-01 -.71439E-01 -.71888E-01 -.71434E-01
-.70190E-01 -.68363E-01 -.66207E-01 -.63960E-01 -.61794E-01
-.59777E-01 -.57850E-01 -.55841E-01 -.53488E-01 -.50498E-01
-.46599E-01 -.41601E-01 -.35437E-01 -.28189E-01 -.20088E-01
-.11484E-01 -.27973E-02  .55369E-02  .13137E-01  .19725E-01
 .25165E-01  .29479E-01  .32829E-01  .35490E-01  .37796E-01
 .40086E-01  .42652E-01  .45694E-01  .49302E-01  .53451E-01
 .58020E-01  .62823E-01  .67652E-01  .72312E-01  .76657E-01
 .80603E-01  .84134E-01  .87283E-01  .90112E-01  .92679E-01
 .95015E-01  .97097E-01  .98850E-01  .10015      .10085
 .10080      .99885E-01  .98060E-01  .95351E-01  .91864E-01
 .87774E-01  .83297E-01  .78653E-01  .74038E-01  .69587E-01
 .65362E-01  .61349E-01  .57472E-01  .53623E-01  .49699E-01
 .45637E-01  .41443E-01  .37211E-01  .33115E-01  .29392E-01
 .26301E-01  .24077E-01  .22887E-01  .22788E-01  .23706E-01
 .25437E-01  .27668E-01  .30019E-01  .32102E-01  .33574E-01
 .34194E-01  .33858E-01  .32610E-01  .30629E-01  .28196E-01
 .25632E-01  .23242E-01  .21254E-01  .19771E-01  .18750E-01
 .18009E-01  .17256E-01  .16138E-01  .14314E-01  .11510E-01
 .75799E-02  .25345E-02 -.34549E-02 -.10078E-01 -.16938E-01
-.23611E-01 -.29719E-01 -.34990E-01 -.39301E-01 -.42689E-01
-.45339E-01 -.47545E-01 -.49641E-01 -.51936E-01 -.54649E-01
-.57858E-01 -.61477E-01 -.65267E-01 -.68873E-01 -.71884E-01
-.73908E-01 -.74646E-01 -.73951E-01 -.71863E-01 -.68613E-01
-.64596E-01 -.60312E-01 -.56290E-01 -.53011E-01 -.50832E-01
-.49933E-01 -.50299E-01 -.51727E-01 -.53867E-01 -.56287E-01
-.58552E-01 -.60293E-01 -.61274E-01 -.61423E-01 -.60838E-01
-.59761E-01 -.58532E-01 -.57516E-01 -.57037E-01 -.57319E-01
-.58444E-01 -.60336E-01 -.62780E-01 -.65459E-01 -.68010E-01
-.70091E-01 -.71433E-01 -.71888E-01 -.71438E-01 -.70199E-01
-.68376E-01 -.66220E-01 -.63973E-01 -.61807E-01 -.59789E-01
-.57862E-01 -.55854E-01 -.53505E-01 -.50520E-01 -.46629E-01
-.41638E-01 -.35481E-01 -.28241E-01 -.20145E-01 -.11543E-01
-.28568E-02  .54806E-02  .13086E-01  .19681E-01  .25130E-01
 .29451E-01  .32807E-01  .35472E-01  .37779E-01  .40068E-01
 .42631E-01  .45669E-01  .49272E-01  .53417E-01  .57983E-01
 .62785E-01  .67614E-01  .72276E-01  .76623E-01  .80573E-01
 .84106E-01  .87258E-01  .90089E-01  .92659E-01  .94996E-01
 .97080E-01  .98837E-01  .10014      .10085      .10080
 .99897E-01  .98081E-01  .95379E-01  .91899E-01  .87814E-01
 .83339E-01  .78697E-01  .74081E-01  .69628E-01  .65402E-01
 .61387E-01  .57510E-01  .53661E-01  .49738E-01  .45678E-01
 .41485E-01
 10.000      71.570      58.040      58.540      52.530
 43.440      42.709      38.940      30.670      41.160
 45.310
CASE  19  100KT.,OBS.1000FT.AHEAD(B)
  361    12   .30193
 361.00      .47629E-01  .46950E-01  .47685E-01  .49038E-01
 .50092E-01  .50034E-01  .48348E-01  .44946E-01  .40194E-01
 .34834E-01  .29817E-01  .26084E-01  .24350E-01  .24930E-01
 .27663E-01  .31936E-01  .36816E-01  .41250E-01  .44302E-01
 .45356E-01  .44250E-01  .41310E-01  .37266E-01  .33082E-01
 .29724E-01  .27927E-01  .28020E-01  .29831E-01  .32711E-01
 .35675E-01  .37614E-01  .37543E-01  .34829E-01  .29347E-01
 .21521E-01  .12247E-01  .27217E-02 -.58115E-02 -.12313E-01
-.16161E-01 -.17267E-01 -.16081E-01 -.13471E-01 -.10515E-01
-.82448E-02 -.74078E-02 -.82901E-02 -.10652E-01 -.13785E-01
-.16680E-01 -.18273E-01 -.17709E-01 -.14572E-01 -.90217E-02
-.18141E-02  .58102E-02  .12338E-01  .16256E-01  .16330E-01
 .11820E-01  .26055E-02 -.10826E-01 -.27497E-01 -.46161E-01
-.65549E-01 -.84617E-01 -.10271      -.11961      -.13553
-.15091      -.16623      -.18181      -.19757      -.21303
-.22724      -.23902      -.24708      -.25034      -.24814
-.24040      -.22766      -.21102      -.19196      -.17205
-.15272      -.13504      -.11950      -.10606      -.94189E-01
-.83063E-01 -.71801E-01 -.59696E-01 -.46398E-01 -.31998E-01
-.17009E-01 -.22428E-02  .11386E-01  .23079E-01  .32342E-01
 .39109E-01  .43755E-01  .47012E-01  .49804E-01  .53027E-01
 .57345E-01  .63032E-01  .69910E-01  .77387E-01  .84594E-01
 .90590E-01  .94583E-01  .96118E-01  .95197E-01  .92288E-01
 .88234E-01  .84072E-01  .80816E-01  .79232E-01  .79675E-01
 .82020E-01  .85693E-01  .89806E-01  .93364E-01  .95491E-01
 .95627E-01  .93658E-01  .89938E-01  .85205E-01  .80412E-01
 .76510E-01  .74224E-01  .73891E-01  .75373E-01  .78096E-01
 .81168E-01  .83586E-01  .84459E-01  .83207E-01  .79696E-01
 .74264E-01  .67646E-01  .60810E-01  .54738E-01  .50209E-01
 .47629E-01  .46950E-01  .47685E-01  .49037E-01  .50092E-01
 .50034E-01  .48349E-01  .44948E-01  .40197E-01  .34838E-01
 .29820E-01  .26086E-01  .24350E-01  .24929E-01  .27661E-01
 .31933E-01  .36812E-01  .41247E-01  .44301E-01  .45356E-01
 .44252E-01  .41312E-01  .37269E-01  .33085E-01  .29725E-01
 .27928E-01  .28020E-01  .29829E-01  .32709E-01  .35674E-01
 .37614E-01  .37544E-01  .34833E-01  .29352E-01  .21526E-01
 .12253E-01  .27276E-02 -.58066E-02 -.12310E-01 -.16159E-01
-.17268E-01 -.16083E-01 -.13473E-01 -.10518E-01 -.82468E-02
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Figure E-1-Continued.

```
-.74089E-02 -.82901E-02 -.10651E-01 -.13784E-01 -.16680E-01
-.18274E-01 -.17711E-01 -.14575E-01 -.90267E-02 -.18193E-02
 .58055E-02  .12335E-01  .16255E-01  .16332E-01  .11826E-01
 .26146E-02 -.10814E-01 -.27485E-01 -.46146E-01 -.65533E-01
-.84599E-01 -.10269     -.11959     -.13551     -.15089
-.16621     -.18178     -.19755     -.21300     -.22722
-.23900     -.24707     -.25034     -.24815     -.24043
-.22770     -.21107     -.19201     -.17210     -.15278
-.13509     -.11955     -.10610     -.94229E-01 -.83104E-01
-.71844E-01 -.59745E-01 -.46452E-01 -.32058E-01 -.17072E-01
-.23040E-02  .11330E-01  .23032E-01  .32305E-01  .39083E-01
 .43736E-01  .46997E-01  .49789E-01  .53008E-01  .57319E-01
 .62999E-01  .69872E-01  .77346E-01  .84556E-01  .90561E-01
 .94567E-01  .96117E-01  .95210E-01  .92311E-01  .88261E-01
 .84098E-01  .80834E-01  .79237E-01  .79667E-01  .82000E-01
 .85666E-01  .89779E-01  .93345E-01  .95483E-01  .95635E-01
 .93681E-01  .89972E-01  .85243E-01  .80448E-01  .76537E-01
 .74236E-01  .73887E-01  .75355E-01  .78071E-01  .81144E-01
 .83572E-01  .84460E-01  .83229E-01  .79737E-01  .74320E-01
 .67710E-01  .60872E-01  .54789E-01  .50243E-01  .47645E-01
 .46948E-01  .47673E-01  .49024E-01  .50086E-01  .50042E-01
 .48375E-01  .44991E-01  .40251E-01  .34894E-01  .29868E-01
 .26117E-01  .24357E-01  .24910E-01  .27620E-01  .31879E-01
 .36757E-01  .41203E-01  .44276E-01  .45355E-01  .44276E-01
 .41355E-01  .37320E-01  .33132E-01  .29757E-01  .27938E-01
 .28006E-01  .29797E-01  .32669E-01  .35639E-01  .37599E-01
 .37560E-01  .34885E-01  .29441E-01  .21642E-01  .12382E-01
 .28527E-02 -.57025E-02 -.12238E-01 -.16126E-01 -.17269E-01
-.16111E-01 -.13515E-01 -.10557E-01 -.82705E-02 -.74083E-02
-.82645E-02 -.10608E-01 -.13737E-01 -.16643E-01 -.18263E-01
-.17738E-01 -.14642E-01 -.91271E-02 -.19376E-02  .56910E-02
 .12249E-01  .16220E-01  .16366E-01  .11938E-01  .28003E-02
-.10565E-01 -.27189E-01 -.45827E-01 -.65211E-01 -.84288E-01
-.10239     -.11932     -.13525     -.15063     -.16595
-.16152
 11.000      73.720      70.090      65.370      63.670
 57.670      51.320      42.879      34.260      30.250
 36.670      53.840
CASE  20  100KT.,OBS.2000FT.AHEAD(B)
  361     12  .30193
 361.00      .35371E-01  .42424E-01  .46434E-01  .46693E-01
 .43431E-01  .37761E-01  .31427E-01  .26399E-01  .24420E-01
 .26595E-01  .33116E-01  .43200E-01  .55233E-01  .67107E-01
 .76665E-01  .82159E-01  .82617E-01  .78042E-01  .69396E-01
 .58374E-01  .47022E-01  .37287E-01  .30593E-01  .27550E-01
 .27846E-01  .30362E-01  .33458E-01  .35395E-01  .34759E-01
 .30825E-01  .23742E-01  .14529E-01  .48517E-02 -.33461E-02
-.82886E-02 -.87839E-02 -.45142E-02  .38647E-02  .14839E-01
 .26349E-01  .36219E-01  .42620E-01  .44462E-01  .41615E-01
 .34928E-01  .26032E-01  .16966E-01  .97223E-02  .57982E-02
 .58683E-02  .96371E-02  .15912E-01  .22878E-01  .28509E-01
 .31032E-01  .29325E-01  .23180E-01  .13352E-01  .14020E-02
-.10644E-01 -.20734E-01 -.27233E-01 -.29270E-01 -.26913E-01
-.21136E-01 -.13581E-01 -.61774E-02 -.70499E-03  .16051E-02
 .33836E-03 -.40257E-02 -.10243E-01 -.16607E-01 -.21361E-01
-.23118E-01 -.21199E-01 -.15807E-01 -.80089E-02  .48664E-03
 .76892E-02  .11753E-01  .11370E-01  .60438E-02 -.38176E-02
-.17006E-01 -.31786E-01 -.46285E-01 -.58882E-01 -.68545E-01
-.75006E-01 -.78756E-01 -.80859E-01 -.82638E-01 -.85290E-01
-.89559E-01 -.95504E-01 -.10246     -.10916     -.11405
```

```
-.11564     -.11293     -.10565     -.94396E-01 -.80586E-01
-.66165E-01 -.53226E-01 -.43566E-01 -.38299E-01 -.37601E-01
-.40664E-01 -.45857E-01 -.51072E-01 -.54175E-01 -.53471E-01
-.48072E-01 -.38097E-01 -.24646E-01 -.95689E-02  .49366E-02
 .16796E-01  .24503E-01  .27439E-01  .25992E-01  .21456E-01
 .15726E-01  .10870E-01  .86602E-02  .10174E-01  .15557E-01
 .23993E-01  .33895E-01  .43271E-01  .50174E-01  .53147E-01
 .51560E-01  .45753E-01  .36970E-01  .27084E-01  .18188E-01
 .12132E-01  .10120E-01  .12453E-01  .18478E-01  .26749E-01
 .35366E-01  .42420E-01  .46432E-01  .46694E-01  .43434E-01
 .37765E-01  .31430E-01  .26401E-01  .24420E-01  .26592E-01
 .33110E-01  .43192E-01  .55225E-01  .67100E-01  .76660E-01
 .82157E-01  .82618E-01  .78047E-01  .69403E-01  .58382E-01
 .47029E-01  .37292E-01  .30596E-01  .27551E-01  .27846E-01
 .30360E-01  .33456E-01  .35394E-01  .34761E-01  .30829E-01
 .23748E-01  .14536E-01  .48580E-02 -.33414E-02 -.82868E-02
-.87851E-02 -.45185E-02  .38580E-02  .14832E-01  .26342E-01
 .36213E-01  .42617E-01  .44462E-01  .41618E-01  .34933E-01
 .26038E-01  .16971E-01  .97258E-02  .57994E-02  .58668E-02
 .96336E-02  .15908E-01  .22874E-01  .28506E-01  .31031E-01
 .29328E-01  .23185E-01  .13359E-01  .14096E-02 -.10637E-01
-.20729E-01 -.27230E-01 -.29270E-01 -.26916E-01 -.21142E-01
-.13588E-01 -.61837E-02 -.70963E-03  .16041E-02  .34168E-03
-.40184E-02 -.10233E-01 -.16598E-01 -.21355E-01 -.23119E-01
-.21206E-01 -.15821E-01 -.80268E-02  .46870E-03  .76754E-02
 .11748E-01  .11378E-01  .60652E-02 -.37841E-02 -.16963E-01
-.31740E-01 -.46241E-01 -.58844E-01 -.68517E-01 -.74988E-01
-.78745E-01 -.80852E-01 -.82629E-01 -.85276E-01 -.89537E-01
-.95476E-01 -.10243     -.10913     -.11403     -.11565
-.11296     -.10569     -.94459E-01 -.80659E-01 -.66237E-01
-.53287E-01 -.43608E-01 -.38316E-01 -.37594E-01 -.40639E-01
-.45825E-01 -.51045E-01 -.54167E-01 -.53489E-01 -.48121E-01
-.38174E-01 -.24741E-01 -.96691E-02  .48459E-02  .16728E-01
 .24466E-01  .27435E-01  .26015E-01  .21495E-01  .15767E-01
 .10898E-01  .86637E-02  .10148E-01  .15501E-01  .23917E-01
 .33815E-01  .43203E-01  .50132E-01  .53141E-01  .51593E-01
 .45818E-01  .37054E-01  .27170E-01  .18258E-01  .12170E-01
 .10118E-01  .12413E-01  .18409E-01  .26666E-01  .35288E-01
 .42365E-01  .46411E-01  .46710E-01  .43481E-01  .37829E-01
 .31492E-01  .26440E-01  .24421E-01  .26546E-01  .33020E-01
 .43070E-01  .55091E-01  .66978E-01  .76574E-01  .82123E-01
 .82643E-01  .78125E-01  .69521E-01  .58517E-01  .47157E-01
 .37393E-01  .30655E-01  .27566E-01  .27826E-01  .30321E-01
 .33422E-01  .35383E-01  .34789E-01  .30900E-01  .23856E-01
 .14663E-01  .49796E-02 -.32510E-02 -.82483E-02 -.88107E-02
-.46065E-02  .37218E-02  .14672E-01  .26188E-01  .36095E-01
 .42557E-01  .44470E-01  .41689E-01  .35050E-01  .26174E-01
 .17096E-01  .98113E-02  .58289E-02  .58363E-02  .95540E-02
 .15802E-01  .22771E-01  .28439E-01  .31022E-01  .29389E-01
 .23314E-01  .13537E-01  .16073E-02 -.10454E-01 -.20591E-01
-.27159E-01 -.29274E-01 -.26987E-01 -.21257E-01 -.13717E-01
-.62954E-02 -.77687E-03  .15952E-02  .39098E-03 -.39263E-02
-.10124E-01
 11.000      68.050      60.990      57.210      58.040
 54.770      46.570      46.800      40.500      41.990
 37.500      59.250
CASE  21  100KT.,OBS.4000FT.AHEAD(B)
  361     12  .30193
 361.00      .11977E-02 -.18295E-03 -.16612E-02 -.29337E-02
-.37027E-02 -.37461E-02 -.29685E-02 -.14229E-02  .70319E-03
```

Figure E-1-Continued.

```
 .31338E-02  .55704E-02  .77628E-02  .95675E-02  .10978E-01
 .12123E-01  .13223E-01  .14531E-01  .16257E-01  .18497E-01
 .21195E-01  .24136E-01  .26976E-01  .29310E-01  .30755E-01
 .31037E-01  .30057E-01  .27922E-01  .24931E-01  .21525E-01
 .18201E-01  .15412E-01  .13476E-01  .12519E-01  .12448E-01
 .12982E-01  .13717E-01  .14222E-01  .14139E-01  .13269E-01
 .11622E-01  .94224E-02  .70635E-02  .50295E-02  .37926E-02
 .37120E-02  .49575E-02  .74711E-02  .10977E-01  .15037E-01
 .19136E-01  .22783E-01  .25605E-01  .27405E-01  .28190E-01
 .28143E-01  .27562E-01  .26779E-01  .26070E-01  .25586E-01
 .25318E-01  .25103E-01  .24671E-01  .23720E-01  .22001E-01
 .19394E-01  .15952E-01  .11909E-01  .76437E-02  .36038E-02
 .21610E-03 -.22047E-02 -.35235E-02 -.38146E-02 -.33443E-02
-.25109E-02 -.17545E-02 -.14565E-02 -.18518E-02 -.29741E-02
-.46473E-02 -.65263E-02 -.81787E-02 -.91906E-02 -.92709E-02
-.83332E-02 -.65334E-02 -.42557E-02 -.20456E-02 -.50584E-03
-.17432E-03 -.14118E-02 -.43223E-02 -.87253E-02 -.14183E-01
-.20084E-01 -.25757E-01 -.30601E-01 -.34194E-01 -.36374E-01
-.37250E-01 -.37171E-01 -.36639E-01 -.36189E-01 -.36275E-01
-.37165E-01 -.38886E-01 -.41224E-01 -.43766E-01 -.46000E-01
-.47419E-01 -.47639E-01 -.46473E-01 -.43969E-01 -.40401E-01
-.36200E-01 -.31864E-01 -.27850E-01 -.24482E-01 -.21887E-01
-.19985E-01 -.18514E-01 -.17110E-01 -.15395E-01 -.13073E-01
-.10010E-01 -.62669E-02 -.20923E-02  .21251E-02  .59397E-02
 .89419E-02  .10843E-01  .11533E-01  .11100E-01  .98038E-02
 .80179E-02  .61455E-02  .45355E-02  .34134E-02  .28449E-02
 .27364E-02  .28737E-02  .29877E-02  .28304E-02  .22425E-02
 .11987E-02 -.18187E-03 -.16603E-02 -.29329E-02 -.37024E-02
-.37462E-02 -.29692E-02 -.14242E-02  .70165E-03  .31321E-02
 .55687E-02  .77614E-02  .95664E-02  .10977E-01  .12122E-01
 .13222E-01  .14530E-01  .16256E-01  .18495E-01  .21194E-01
 .24134E-01  .26975E-01  .29309E-01  .30754E-01  .31037E-01
 .30058E-01  .27923E-01  .24933E-01  .21528E-01  .18204E-01
 .15413E-01  .13477E-01  .12519E-01  .12448E-01  .12981E-01
 .13717E-01  .14222E-01  .14139E-01  .13270E-01  .11624E-01
 .94239E-02  .70649E-02  .50305E-02  .37929E-02  .37114E-02
 .49560E-02  .74687E-02  .10975E-01  .15034E-01  .19133E-01
 .22781E-01  .25603E-01  .27404E-01  .28190E-01  .28143E-01
 .27562E-01  .26780E-01  .26070E-01  .25586E-01  .25318E-01
 .25103E-01  .24671E-01  .23721E-01  .22003E-01  .19396E-01
 .15955E-01  .11913E-01  .76479E-02  .36080E-02  .21977E-03
-.22021E-02 -.35223E-02 -.38148E-02 -.33454E-02 -.25124E-02
-.17556E-02 -.14565E-02 -.18502E-02 -.29709E-02 -.46430E-02
-.65216E-02 -.81752E-02 -.91890E-02 -.92721E-02 -.83371E-02
-.65396E-02 -.42630E-02 -.20519E-02 -.50914E-03 -.17266E-03
-.14040E-02 -.43084E-02 -.87060E-02 -.14160E-01 -.20060E-01
-.25735E-01 -.30582E-01 -.34182E-01 -.36367E-01 -.37248E-01
-.37173E-01 -.36641E-01 -.36190E-01 -.36273E-01 -.37158E-01
-.38876E-01 -.41210E-01 -.43753E-01 -.45989E-01 -.47415E-01
-.47642E-01 -.46484E-01 -.43988E-01 -.40426E-01 -.36227E-01
-.31891E-01 -.27875E-01 -.24502E-01 -.21902E-01 -.19996E-01
-.18524E-01 -.17121E-01 -.15409E-01 -.13093E-01 -.10036E-01
-.62970E-02 -.21249E-02  .20935E-02  .59125E-02  .89220E-02
 .10832E-01  .11532E-01  .11107E-01  .98172E-02  .80339E-02
 .61609E-02  .45476E-02  .34208E-02  .28477E-02  .27359E-02
 .28722E-02  .29879E-02  .28340E-02  .22504E-02  .12106E-02
-.16746E-03 -.16461E-02 -.29221E-02 -.36979E-02 -.37497E-02
-.29812E-02 -.14433E-02  .67760E-03  .31061E-02  .55440E-02
 .77397E-02  .95491E-02  .10964E-01  .12110E-01  .13209E-01
 .14514E-01  .16233E-01  .18466E-01  .21160E-01  .24100E-01

 .26943E-01  .29285E-01  .30743E-01  .31042E-01  .30078E-01
 .27956E-01  .24974E-01  .21572E-01  .18244E-01  .15444E-01
 .13496E-01  .12525E-01  .12444E-01  .12972E-01  .13707E-01
 .14218E-01  .14146E-01  .13287E-01  .11651E-01  .94569E-02
 .70971E-02  .50549E-02  .38032E-02  .37033E-02  .49284E-02
 .74239E-02  .10917E-01  .14972E-01  .19073E-01  .22731E-01
 .25567E-01  .27384E-01  .28185E-01  .28148E-01  .27574E-01
 .26792E-01  .26080E-01  .25592E-01  .25321E-01  .25107E-01
 .24682E-01  .23742E-01  .22038E-01  .19447E-01  .16018E-01
 .11983E-01  .77183E-02  .36709E-02  .26883E-03 -.21708E-02
-.35093E-02
 11.000      61.530      53.220      47.940      54.750
 42.480      33.530      23.671      35.770      37.130
 34.790      45.920
CASE  22  140KT.,OBS.1000FT.AHEAD(B)
  361    11   .27778
 361.00       .18713E-01  .28999E-01  .39852E-01  .50699E-01
 .60960E-01   .70097E-01  .77640E-01  .83221E-01  .86579E-01
 .87557E-01   .86097E-01  .82215E-01  .75981E-01  .67505E-01
 .56922E-01   .44393E-01  .30111E-01  .14318E-01 -.26753E-02
-.20475E-01  -.38592E-01 -.56438E-01 -.73345E-01 -.88590E-01
-.10144      -.11121     -.11729     -.11926     -.11687
-.11010      -.99212E-01 -.84676E-01 -.67200E-01 -.47674E-01
-.27120E-01  -.66328E-02  .12679E-01  .29755E-01  .43634E-01
 .53502E-01   .58733E-01  .58911E-01  .53854E-01  .43617E-01
 .28496E-01   .90085E-02 -.14122E-01 -.40011E-01 -.67649E-01
-.95973E-01  -.12392     -.15049     -.17485     -.19634
-.21454      -.22930     -.24075     -.24923     -.25527
-.25950      -.26261     -.26519     -.26771     -.27045
-.27342      -.27638     -.27887     -.28022     -.27966
-.27635      -.26952     -.25850     -.24283     -.22227
-.19682      -.16675     -.13256     -.94924E-01 -.54667E-01
-.12707E-01   .29990E-01  .72456E-01  .11375      .15298
 .18932       .22203      .25047      .27408      .29245
 .30528       .31244      .31395      .31001      .30099
 .28742       .26996      .24940      .22656      .20233
 .17755       .15302      .12946      .10746      .87526E-01
 .70018E-01   .55196E-01  .43208E-01  .34116E-01  .27893E-01
 .24432E-01   .23557E-01  .25018E-01  .28500E-01  .33622E-01
 .39950E-01   .47014E-01  .54323E-01  .61392E-01  .67777E-01
 .73090E-01   .77031E-01  .79399E-01  .80095E-01  .79126E-01
 .76587E-01   .72634E-01  .67476E-01  .61335E-01  .54442E-01
 .47012E-01   .39250E-01  .31354E-01  .23518E-01  .15952E-01
 .88898E-02   .25878E-02 -.26670E-02 -.65802E-02 -.88669E-02
-.92839E-02  -.76595E-02 -.39251E-02  .18646E-02  .95158E-02
 .18705E-01   .28990E-01  .39843E-01  .50692E-01  .60953E-01
 .70090E-01   .77636E-01  .83218E-01  .86578E-01  .87558E-01
 .86101E-01   .82221E-01  .75989E-01  .67515E-01  .56933E-01
 .44406E-01   .30125E-01  .14333E-01 -.26593E-02 -.20460E-01
-.38577E-01  -.56424E-01 -.73332E-01 -.88579E-01 -.10143
-.11120      -.11729     -.11926     -.11687     -.11011
-.99226E-01  -.84692E-01 -.67218E-01 -.47694E-01 -.27140E-01
-.66522E-02   .12662E-01  .29740E-01  .43622E-01  .53495E-01
 .58731E-01   .58914E-01  .53861E-01  .43629E-01  .28510E-01
 .90278E-02  -.14101E-01 -.39986E-01 -.67624E-01 -.95948E-01
-.12389      -.15047     -.17483     -.19632     -.21452
-.22929      -.24074     -.24922     -.25526     -.25950
-.26260      -.26518     -.26771     -.27045     -.27341
-.27637      -.27886     -.28022     -.27966     -.27635
-.26953      -.25851     -.24285     -.22229     -.19685
```

Figure E-1-Continued.

```
-.16678      -.13259      -.94959E-01 -.54703E-01 -.12746E-01
 .29952E-01  .72420E-01   .11370      .15293      .18928
 .22199      .25043       .27405      .29243      .30527
 .31243      .31395       .31002      .30101      .28745
 .27000      .24944       .22661      .20238      .17761
 .15308      .12951       .10752      .87575E-01  .70061E-01
 .55232E-01  .43238E-01   .34139E-01  .27908E-01  .24440E-01
 .23557E-01  .25012E-01   .28488E-01  .33604E-01  .39929E-01
 .46992E-01  .54298E-01   .61369E-01  .67756E-01  .73073E-01
 .77019E-01  .79392E-01   .80095E-01  .79133E-01  .76599E-01
 .72652E-01  .67498E-01   .61363E-01  .54470E-01  .47042E-01
 .39284E-01  .31387E-01   .23551E-01  .15986E-01  .89190E-02
 .26140E-02 -.26462E-02  -.65662E-02 -.88610E-02 -.92869E-02
-.76740E-02 -.39496E-02   .18299E-02  .94709E-02  .18653E-01
 .28934E-01  .39783E-01   .50632E-01  .60899E-01  .70042E-01
 .77597E-01  .83193E-01   .86563E-01  .87559E-01  .86116E-01
 .82249E-01  .76032E-01   .67572E-01  .57003E-01  .44488E-01
 .30219E-01  .14437E-01  -.25477E-02 -.20343E-01 -.38458E-01
-.56308E-01 -.73224E-01  -.88484E-01 -.10135      -.11115
-.11726      -.11926      -.11690     -.11018     -.99316E-01
-.84809E-01 -.67355E-01  -.47842E-01 -.27294E-01 -.68029E-02
 .12523E-01  .29622E-01   .43530E-01  .53436E-01  .58709E-01
 .58932E-01  .53922E-01   .43732E-01  .28652E-01  .92041E-02
-.13896E-01 -.39762E-01  -.67386E-01 -.95707E-01 -.12366
-.15025      -.17463      -.19614     -.21438     -.22918
-.24066      -.24916      -.25522     -.25947     -.26258
-.26516      -.26769      -.27042     -.27338     -.27635
-.27885      -.28022      -.27968     -.27640     -.26961
-.25865
 10.000       75.490       74.670      74.030      70.880
 65.650       60.940       52.190      44.630      24.360
 37.400
CASE  23  140KT.,OBS.2000FT.AHEAD(B)
  361    11   .27778
 361.00       .81107E-01   .77349E-01  .73187E-01  .68739E-01
 .64191E-01   .59791E-01   .55834E-01  .52638E-01  .50497E-01
 .49641E-01   .50190E-01   .52124E-01  .55267E-01  .59290E-01
 .63740E-01   .68079E-01   .71750E-01  .74232E-01  .75106E-01
 .74100E-01   .71119E-01   .66249E-01  .59745E-01  .51990E-01
 .43446E-01   .34599E-01   .25902E-01  .17740E-01  .10397E-01
 .40495E-02  -.12202E-02  -.54040E-02 -.85374E-02 -.10670E-01
-.11846E-01  -.12094E-01  -.11435E-01 -.99065E-02 -.75914E-02
-.46539E-02  -.13677E-02   .18688E-02  .45373E-02  .60292E-02
 .56969E-02   .29234E-02  -.27971E-02 -.11782E-01 -.24092E-01
-.39494E-01  -.57442E-01  -.77110E-01 -.97447E-01 -.11726
-.13534      -.15054      -.16193     -.16881     -.17086
-.16807      -.16077      -.14957     -.13528     -.11880
-.10106      -.82897E-01  -.65000E-01 -.47876E-01 -.31822E-01
-.16945E-01  -.31970E-02   .95735E-02  .21564E-01  .32956E-01
 .43872E-01   .54331E-01   .64239E-01  .73384E-01  .81453E-01
 .88061E-01   .92791E-01   .95232E-01  .95026E-01  .91899E-01
 .85696E-01   .76402E-01   .64151E-01  .49231E-01  .32074E-01
 .13238E-01  -.66175E-02  -.26765E-01 -.46446E-01 -.64918E-01
-.81487E-01  -.95560E-01  -.10667     -.11450     -.11892
-.11997      -.11784      -.11289     -.10559     -.96471E-01
-.86126E-01  -.75133E-01  -.64037E-01 -.53316E-01 -.43370E-01
-.34500E-01  -.26913E-01  -.20718E-01 -.15939E-01 -.12521E-01
-.10335E-01  -.91969E-02  -.88643E-02 -.90521E-02 -.94433E-02
-.97001E-02  -.94851E-02  -.84803E-02 -.64138E-02 -.30841E-02
 .16214E-02   .77043E-02   .15056E-01  .23456E-01  .32592E-01

 .42088E-01   .51535E-01   .60535E-01  .68733E-01  .75850E-01
 .81702E-01   .86206E-01   .89375E-01  .91297E-01  .92109E-01
 .91968E-01   .91023E-01   .89393E-01  .87167E-01  .84394E-01
 .81109E-01   .77352E-01   .73190E-01  .68743E-01  .64195E-01
 .59794E-01   .55837E-01   .52640E-01  .50498E-01  .49641E-01
 .50189E-01   .52121E-01   .55264E-01  .59286E-01  .63736E-01
 .68076E-01   .71747E-01   .74231E-01  .75106E-01  .74102E-01
 .71121E-01   .66254E-01   .59752E-01  .51997E-01  .43454E-01
 .34606E-01   .25909E-01   .17747E-01  .10402E-01  .40546E-02
-.12164E-02  -.54008E-02  -.85360E-02 -.10670E-01 -.11846E-01
-.12094E-01  -.11436E-01  -.99083E-02 -.75940E-02 -.46571E-02
-.13703E-02   .18663E-02   .45356E-02  .60288E-02  .56981E-02
 .29273E-02  -.27909E-02  -.11772E-01 -.24080E-01 -.39480E-01
-.57426E-01  -.77094E-01  -.97430E-01 -.11725      -.13533
-.15053      -.16192      -.16881     -.17086     -.16807
-.16078      -.14958      -.13529     -.11882     -.10108
-.82913E-01  -.65017E-01  -.47891E-01 -.31836E-01 -.16959E-01
-.32102E-02   .95609E-02   .21551E-01  .32945E-01  .43861E-01
 .54322E-01   .64231E-01   .73377E-01  .81447E-01  .88056E-01
 .92788E-01   .95232E-01   .95028E-01  .91905E-01  .85707E-01
 .76417E-01   .64170E-01   .49255E-01  .32101E-01  .13268E-01
-.65849E-02  -.26731E-01  -.46414E-01 -.64885E-01 -.81458E-01
-.95535E-01  -.10665      -.11449     -.11891     -.11996
-.11784      -.11290      -.10560     -.96493E-01 -.86152E-01
-.75161E-01  -.64064E-01  -.53344E-01 -.43395E-01 -.34523E-01
-.26933E-01  -.20734E-01  -.15952E-01 -.12529E-01 -.10341E-01
-.91996E-02  -.88644E-02  -.90516E-02 -.94428E-02 -.97009E-02
-.94880E-02  -.84868E-02  -.64246E-02 -.30996E-02  .15998E-02
 .76774E-02   .15024E-01   .23419E-01  .32552E-01  .42047E-01
 .51495E-01   .60497E-01   .68699E-01  .75820E-01  .81678E-01
 .86188E-01   .89363E-01   .91290E-01  .92107E-01  .91970E-01
 .91027E-01   .89402E-01   .87179E-01  .84409E-01  .81127E-01
 .77373E-01   .73213E-01   .68767E-01  .64219E-01  .59817E-01
 .55857E-01   .52655E-01   .50507E-01  .49642E-01  .50181E-01
 .52107E-01   .55242E-01   .59261E-01  .63709E-01  .68051E-01
 .71728E-01   .74220E-01   .75107E-01  .74115E-01  .71149E-01
 .66292E-01   .59800E-01   .52053E-01  .43514E-01  .34667E-01
 .25968E-01   .17802E-01   .10451E-01  .40959E-02 -.11819E-02
-.53746E-02  -.85160E-02  -.10657E-01 -.11841E-01 -.12096E-01
-.11444E-01  -.99225E-02  -.76142E-02 -.46810E-02 -.13962E-02
 .18424E-02   .45183E-02   .60234E-02  .57104E-02  .29616E-02
-.27300E-02  -.11683E-01  -.23964E-01 -.39337E-01 -.57264E-01
-.76920E-01  -.97254E-01  -.11708     -.13518     -.15041
-.16184      -.16877      -.17086     -.16812     -.16086
-.14970      -.13544      -.11898     -.10125     -.83085E-01
-.65185E-01  -.48052E-01  -.31987E-01 -.17099E-01 -.33413E-02
 .94381E-02
 10.000       68.380       67.930      68.010      65.200
 62.530       57.500       53.910      45.450      44.810
 38.292
CASE  24  140KT.,OBS.4000FT.AHEAD(B)
  361    11   .27778
 361.00       -.28730E-01  -.29296E-01 -.30247E-01 -.31473E-01
-.32816E-01  -.34094E-01  -.35135E-01 -.35805E-01 -.36029E-01
-.35801E-01  -.35178E-01  -.34262E-01 -.33181E-01 -.32055E-01
-.30970E-01  -.29959E-01  -.28993E-01 -.27986E-01 -.26807E-01
-.25308E-01  -.23353E-01  -.20848E-01 -.17758E-01 -.14125E-01
-.10064E-01  -.57517E-02  -.13903E-02  .27785E-02  .65871E-02
 .98884E-02   .12615E-01   .14776E-01  .16455E-01  .17788E-01
 .18944E-01   .20092E-01   .21378E-01  .22903E-01  .24711E-01
```

Figure E-1-Continued.

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 .26791E-01  .29081E-01  .31488E-01  .33908E-01  .36244E-01
 .38421E-01  .40399E-01  .42168E-01  .43746E-01  .45164E-01
 .46451E-01  .47621E-01  .48665E-01  .49543E-01  .50195E-01
 .50544E-01  .50518E-01  .50061E-01  .49146E-01  .47788E-01
 .46040E-01  .43990E-01  .41745E-01  .39418E-01  .37105E-01
 .34874E-01  .32757E-01  .30746E-01  .28803E-01  .26874E-01
 .24907E-01  .22871E-01  .20769E-01  .18648E-01  .16595E-01
 .14730E-01  .13181E-01  .12067E-01  .11471E-01  .11422E-01
 .11882E-01  .12750E-01  .13868E-01  .15047E-01  .16090E-01
 .16828E-01  .17138E-01  .16969E-01  .16343E-01  .15350E-01
 .14129E-01  .12844E-01  .11647E-01  .10651E-01  .99077E-02
 .93965E-02  .90254E-02  .86474E-02  .80868E-02  .71714E-02
 .57650E-02  .37941E-02  .12640E-02 -.17388E-02 -.50592E-02
-.84974E-02 -.11841E-01 -.14902E-01 -.17543E-01 -.19702E-01
-.21399E-01 -.22727E-01 -.23832E-01 -.24883E-01 -.26034E-01
-.27394E-01 -.29003E-01 -.30818E-01 -.32717E-01 -.34524E-01
-.36032E-01 -.37045E-01 -.37412E-01 -.37061E-01 -.36012E-01
-.34381E-01 -.32367E-01 -.30219E-01 -.28205E-01 -.26563E-01
-.25473E-01 -.25025E-01 -.25211E-01 -.25929E-01 -.27003E-01
-.28216E-01 -.29350E-01 -.30222E-01 -.30712E-01 -.30784E-01
-.30489E-01 -.29949E-01 -.29333E-01 -.28825E-01 -.28586E-01
-.28730E-01 -.29296E-01 -.30246E-01 -.31472E-01 -.32815E-01
-.34093E-01 -.35134E-01 -.35804E-01 -.36029E-01 -.35802E-01
-.35178E-01 -.34263E-01 -.33182E-01 -.32056E-01 -.30970E-01
-.29959E-01 -.28994E-01 -.27987E-01 -.26808E-01 -.25309E-01
-.23355E-01 -.20850E-01 -.17760E-01 -.14128E-01 -.10068E-01
-.57554E-02 -.14019E-02  .27752E-02  .65841E-02  .98859E-02
 .12613E-01  .14775E-01  .16454E-01  .17787E-01  .18943E-01
 .20091E-01  .21377E-01  .22901E-01  .24710E-01  .26789E-01
 .29079E-01  .31486E-01  .33906E-01  .36242E-01  .38419E-01
 .40397E-01  .42167E-01  .43745E-01  .45163E-01  .46450E-01
 .47620E-01  .48664E-01  .49543E-01  .50194E-01  .50544E-01
 .50519E-01  .50061E-01  .49147E-01  .47789E-01  .46041E-01
 .43992E-01  .41747E-01  .39420E-01  .37107E-01  .34876E-01
 .32759E-01  .30747E-01  .28804E-01  .26875E-01  .24909E-01
 .22873E-01  .20771E-01  .18650E-01  .16597E-01  .14731E-01
 .13182E-01  .12067E-01  .11471E-01  .11421E-01  .11881E-01
 .12749E-01  .13867E-01  .15045E-01  .16039E-01  .16827E-01
 .17138E-01  .16969E-01  .16344E-01  .15351E-01  .14131E-01
 .12846E-01  .11649E-01  .10652E-01  .99086E-02  .93971E-02
 .90259E-02  .86481E-02  .80881E-02  .71737E-02  .57684E-02
 .37990E-02  .12703E-02 -.17315E-02 -.50511E-02 -.84889E-02
-.11833E-01 -.14895E-01 -.17537E-01 -.19697E-01 -.21395E-01
-.22724E-01 -.23829E-01 -.24879E-01 -.26030E-01 -.27390E-01
-.28998E-01 -.30811E-01 -.32711E-01 -.34519E-01 -.36028E-01
-.37042E-01 -.37412E-01 -.37063E-01 -.36017E-01 -.34388E-01
-.32375E-01 -.30228E-01 -.28212E-01 -.26569E-01 -.25476E-01
-.25026E-01 -.25209E-01 -.25925E-01 -.26997E-01 -.28210E-01
-.29345E-01 -.30218E-01 -.30710E-01 -.30785E-01 -.30491E-01
-.29952E-01 -.29336E-01 -.28826E-01 -.28586E-01 -.28728E-01
-.29291E-01 -.30240E-01 -.31465E-01 -.32807E-01 -.34086E-01
-.35129E-01 -.35802E-01 -.36029E-01 -.35804E-01 -.35183E-01
-.34269E-01 -.33189E-01 -.32062E-01 -.30977E-01 -.29965E-01
-.29000E-01 -.27993E-01 -.26816E-01 -.25320E-01 -.23370E-01
-.20868E-01 -.17783E-01 -.14154E-01 -.10097E-01 -.57853E-02
-.14317E-02  .27470E-02  .65588E-02  .98643E-02  .12595E-01
 .14761E-01  .16443E-01  .17778E-01  .18935E-01  .20082E-01
 .21366E-01  .22888E-01  .24694E-01  .26772E-01  .29060E-01
 .31467E-01  .33887E-01  .36224E-01  .38403E-01  .40382E-01
 .42153E-01  .43732E-01  .45151E-01  .46439E-01  .47611E-01
```

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 .48655E-01  .49536E-01  .50190E-01  .50543E-01  .50521E-01
 .50068E-01  .49157E-01  .47803E-01  .46059E-01  .44012E-01
 .41769E-01  .39442E-01  .37129E-01  .34897E-01  .32779E-01
 .30766E-01  .28823E-01  .26894E-01  .24928E-01  .22893E-01
 .20792E-01
 10.000      65.570      52.040      52.540      46.530
 37.440      36.710      32.940      24.670      35.160
 39.310
CASE  25  95KT.,OBS.4000FT.AHEAD(BT)
  361     12  .31566
 361.00      .58084E-01  .56843E-01  .54950E-01  .52909E-01
 .51186E-01  .50136E-01  .49953E-01  .50637E-01  .52013E-01
 .53768E-01  .55529E-01  .56942E-01  .57751E-01  .57863E-01
 .57368E-01  .56531E-01  .55742E-01  .55444E-01  .56043E-01
 .57830E-01  .60922E-01  .65240E-01  .70524E-01  .76378E-01
 .82348E-01  .88009E-01  .93028E-01  .97224E-01  .10058
 .10323      .10540      .10734      .10926      .11127
 .11332      .11527      .11683      .11771      .11761
 .11638      .11396      .11051      .10631      .10175
 .97276E-01  .93272E-01  .90036E-01  .87718E-01  .86311E-01
 .85674E-01  .85580E-01  .85783E-01  .86084E-01  .86379E-01
 .86696E-01  .87179E-01  .88060E-01  .89601E-01  .92026E-01
 .95463E-01  .99903E-01  .10519      .11103      .11706
 .12290      .12821      .13276      .13644      .13927
 .14137      .14287      .14387      .14435      .14416
 .14297      .14034      .13574      .12869      .11882
 .10597      .90255E-01  .72093E-01  .52166E-01  .31362E-01
 .10665E-01 -.89617E-02 -.26701E-01 -.41979E-01 -.54538E-01
-.64454E-01 -.72122E-01 -.78190E-01 -.83472E-01 -.88840E-01
-.95118E-01 -.10299      -.11294      -.12518      -.13967
-.15614      -.17408      -.19283      -.21164      -.22972
-.24630      -.26071      -.27241      -.28104      -.28644
-.28867      -.28795      -.28471      -.27947      -.27279
-.26523      -.25725      -.24918      -.24118      -.23321
-.22509      -.21652      -.20716      -.19668      -.18485
-.17157      -.15688      -.14100      -.12423      -.10698
-.89641E-01 -.72580E-01 -.56084E-01 -.40348E-01 -.25481E-01
-.11538E-01  .14525E-02  .13442E-01  .24338E-01  .33997E-01
 .42236E-01  .48870E-01  .53754E-01  .56839E-01  .58206E-01
 .58085E-01  .56845E-01  .54952E-01  .52911E-01  .51187E-01
 .50138E-01  .49953E-01  .50637E-01  .52012E-01  .53768E-01
 .55529E-01  .56941E-01  .57751E-01  .57863E-01  .57369E-01
 .56532E-01  .55743E-01  .55444E-01  .56042E-01  .57828E-01
 .60919E-01  .65237E-01  .70520E-01  .76373E-01  .82345E-01
 .88005E-01  .93025E-01  .97222E-01  .10058      .10323
 .10540      .10734      .10926      .11126      .11332
 .11527      .11683      .11771      .11761      .11638
 .11397      .11051      .10631      .10176      .97279E-01
 .93274E-01  .90037E-01  .87718E-01  .86311E-01  .85672E-01
 .85578E-01  .85781E-01  .86081E-01  .86377E-01  .86693E-01
 .87176E-01  .88056E-01  .89597E-01  .92020E-01  .95455E-01
 .99892E-01  .10517      .11102      .11705      .12289
 .12820      .13275      .13643      .13926      .14136
 .14286      .14386      .14435      .14416      .14298
 .14035      .13576      .12873      .11887      .10603
 .90337E-01  .72188E-01  .52271E-01  .31473E-01  .10775E-01
-.88563E-02 -.26605E-01 -.41896E-01 -.54468E-01 -.64399E-01
-.72078E-01 -.78152E-01 -.83435E-01 -.88798E-01 -.95068E-01
-.10293      -.11285      -.12507      -.13955      -.15600
-.17393      -.19268      -.21149      -.22957      -.24616
```

Figure E-1-Continued.

```
-.26059      -.27232      -.28098      -.28641      -.28866
-.28797      -.28475      -.27953      -.27286      -.26531
-.25733      -.24927      -.24126      -.23330      -.22518
-.21662      -.20727      -.19680      -.18499      -.17173
-.15706      -.14119      -.12444      -.10719      -.89855E-01
-.72791E-01 -.56289E-01 -.40544E-01 -.25669E-01 -.11715E-01
 .12858E-02  .13287E-01  .24197E-01  .33873E-01  .42132E-01
 .48788E-01  .53697E-01  .56807E-01  .58197E-01  .58096E-01
 .56869E-01  .54983E-01  .52940E-01  .51210E-01  .50148E-01
 .49950E-01  .50622E-01  .51988E-01  .53741E-01  .55504E-01
 .56924E-01  .57746E-01  .57869E-01  .57383E-01  .56548E-01
 .55755E-01  .55445E-01  .56025E-01  .57788E-01  .60856E-01
 .65153E-01  .70421E-01  .76267E-01  .82240E-01  .87908E-01
 .92940E-01  .97153E-01  .10053       .10319       .10536
 .10730       .10922       .11122       .11328       .11523
 .11681       .11770       .11763       .11642       .11403
 .11060       .10641       .10185       .97370E-01  .93352E-01
 .90097E-01  .87759E-01  .86332E-01  .85679E-01  .85576E-01
 .85774E-01  .86073E-01  .86370E-01  .86685E-01  .87161E-01
 .88029E-01  .89551E-01  .91953E-01  .95365E-01  .99780E-01
 .10505       .11088       .11691       .12276       .12808
 .13265       .13635       .13921       .14132       .14284
 .14385
 11.000       78.020       72.810       65.070       58.302
 51.243       50.973       53.621       48.810       42.210
 41.532       40.683
```

Figure E-1-Concluded.

End of Document